



01-0467

Corporate Environmental Programs
General Electric Company
100 Woodlawn Avenue, Pittsfield, MA 01201

Transmitted Via UPS Ground

March 27, 2002

Bryan Olson
EPA Project Coordinator
EPA New England
One Congress Street, Suite 1100
Boston, MA 02114-2023

**Re: GE-Pittsfield/Housatonic River Site
Building 71 and Hill 78 On-Plant Consolidation Areas (GECD200)
2002 Construction/Consolidation Activities**

Dear Mr. Olson:

I. Introduction

This letter summarizes the 2002 construction and consolidation activities anticipated to be conducted by the General Electric Company (GE) at the Building 71 and Hill 78 On-Plant Consolidation Areas (OPCAs) at the above-referenced site. As discussed herein, the anticipated activities include the construction of a new portion of the Building 71 OPCA as well as the consolidation in these OPCAs of materials to be generated by remediation and demolition activities performed this year. In general, the construction and consolidation activities described in this letter (and attachments) will be consistent with similar activities that have been performed by GE over the last three years. Such activities will generally be conducted in accordance with the June 1999 *Detailed Work Plan for On-Plant Consolidation Areas* (Work Plan); August 1999 *Addendum to June 1999 Detailed Work Plan*; GE's June 13, 2000 *Response to April 27, 2000 EPA Comments*; the United States Environmental Protection Agency's (EPA's) January 30, 2001 *Final Conditional Approval* letter; and GE's March 9, 2001 letter response to *EPA Conditions for Approval of OPCA Work Plan*. As discussed in the EPA's January 30, 2001 conditional approval and GE's subsequent March 9, 2001 letter, technical information related to the 2002 Building 71 OPCA expansion (i.e., technical drawings and specifications, etc.) is being provided for the EPA's review and approval. The Building 71 and Hill 78 OPCA consolidation plans and related information are provided for informational purposes only.

GE has prepared a Request for Proposal (RFP) that presents technical drawings and specifications to support the 2002 construction and consolidation activities. The RFP has been distributed to prospective contractors concurrently with this letter, as part of GE's internal process for selecting a remediation contractor to perform the construction and consolidation activities. Pertinent sections of the RFP are included as Attachment 1 to this letter for your information and approval where necessary.

The remainder of this letter presents an overview of the anticipated 2002 construction/expansion activities, the consolidation activities planned for each OPCA, and the anticipated implementation schedule for both the construction and consolidation activities.

II. Construction/Expansion Activities

In anticipation of future consolidation activities to be conducted at the OPCAs, GE will construct the next phase of the Building 71 OPCA. Based on current consolidation material volume estimates, it is not anticipated that this new expansion area will be used in 2002. However, the Building 71 OPCA expansion is being constructed this year in order to ensure sufficient capacity for future material consolidation activities, as it is possible that the remaining capacity within the existing OPCA footprint following consolidation activities in 2002 may be inadequate to accommodate consolidation material in subsequent years.

As an overview, the 2002 Building 71 expansion is approximately 1.1 acres in size and will be constructed adjacent to the northwestern perimeter of the current Building 71 OPCA. The baseliner of the expansion area will contain the same components as the existing Building 71 OPCA: a six-inch-thick soil sub-base layer or geotextile; a 60-mil textured HDPE liner; and a geosynthetic drainage composite. The baseliner has been designed to maintain a 2% slope toward the leachate collection system and 0.5% along the leachate collection pipes. Although the new baseliner system will be permanently attached to the existing baseliner system, the leachate collection system for the cell expansion will be isolated from the existing system until such time that material consolidation in this new cell is initiated. In the interim, precipitation collected in the expansion area will be contained within the new cell and discharged into a new perimeter stormwater collection system using portable pumps. Specific construction details related to the expansion are provided in the attached RFP. The technical specifications in the RFP include, among other things, specific requirements for material installation, earthwork activities, erosion control, and site restoration. In addition, Attachment 1 to the RFP provides engineering drawings for the construction/expansion activities, including a subgrade plan, top of liner and leachate collection system plan, and associated construction details.

Engineering calculations prepared in support of the proposed construction/expansion activities are included as Attachment 2 to this letter. As discussed in that attachment, the construction activities related to the new expansion generally consist of extending previously designed and constructed site features (e.g., berms, ditches and pipes); therefore, most of the engineering calculations were prepared previously during the development of the Work Plan and have been submitted and conditionally approved by the EPA. Only those calculations requiring revision to account for new site-specific parameters are included in Attachment 2 to this letter.

On a related issue, during the design of the new stormwater management features to be constructed this year, the need for an additional stormwater basin was also evaluated. As you may recall, the conceptual final stormwater management plan for the OPCA area (provided to EPA in the August 1999 Addendum) initially considered the construction of up to three on-site stormwater basins to accommodate stormwater runoff associated with the OPCAs in their post-use size and condition. To date, two of the three basins have been constructed – one in 1999 at the southwest corner of the Building 71 OPCA and the other in 2000, northeast of the Hill 78 OPCA. The third stormwater basin was conceptually located south of the Hill 78 OPCA, downgradient of the outfall of an existing 48-inch storm sewer that crosses the site.

An evaluation of anticipated off-site stormwater discharges under pre- and post-OPCA development conditions has been performed to determine whether construction of a third stormwater basin is necessary under the anticipated final OPCA configuration. The evaluation indicates that, following closure of the OPCAs, the two existing stormwater basins will be sufficient to manage peak stormwater discharge from the OPCA area to the existing City-owned culvert at Merrill Road. Consequently, at this time, it does not appear that a third stormwater basin is necessary. The technical calculations related to the stormwater basin evaluation are included in Attachment 2 to this letter.

III. Consolidation Activities

In 2002, GE anticipates that approximately 15,000 cubic yards (cy) and 2,250 cy of material may be subject to consolidation in 2002 at the Hill 78 and Building 71 OPCAs, respectively. These materials are anticipated to consist of soils and sediments generated by GE from the Upper ½-Mile Reach Removal Action and by EPA from the 1½-Mile Reach Removal Action, as well as building demolition debris associated with Brownfields-related activities (e.g., demolition of the Building 33 and 34 Complexes).

The attached RFP includes interim filling and grading plans indicating the placement areas within the OPCAs for the materials generated during the Removal Actions and the building demolition activities. The RFP also provides construction-specific requirements for the consolidation of the materials in the OPCAs, including lift thickness, density and moisture control, and slopes.

IV. Anticipated Schedule

Attachment 1 provides a general summary of the construction and consolidation activities planned for the Building 71 and Hill 78 OPCAs for 2002. As indicated above, the contractor selection process for the procurement of a qualified remediation contractor to perform these activities has been initiated concurrently with this letter. GE anticipates that final contractor selection will occur in late April 2002, and that construction and/or consolidation activities will commence shortly thereafter (i.e., early May). At the present time, GE anticipates that the construction/expansion activities described in the RFP will be completed by November 1, 2002. Consolidation activities will be performed throughout the year, with the frequency and duration of the events contingent upon the amount of consolidation materials generated from the Upper ½-Mile and 1½-Mile Reach Removal Actions, as well as building demolition activities. However, at the present time GE anticipates that the transfer and consolidation activities will be performed during two separate placement periods. One placement period is expected to occur during the summer months (June/July), followed by a second placement period in the fall (October/November). Regardless of the specific date and number of placement periods, the consolidation activities are expected to be completed by December 31, 2002. GE will keep EPA informed when additional information regarding the types of such materials, the length of temporary storage for them (if any), and the timetable for transfer of these materials for consolidation at the OPCAs becomes available.

Finally, GE requests EPA approval, to the extent necessary, for the continued temporary storage of sediments and soils excavated from the Upper ½-Mile Reach of the River in Buildings 33-north, 33-X, and 65 during 2002 in accordance with the same substantive conditions previously approved by EPA for temporary storage of such materials in these buildings under prior correspondence between GE and EPA (e.g., GE letters of 11/18/99, 1/4/00, 5/10/00, 8/18/00, 6/25/01, and 7/13/01 and EPA letters of 1/5/00, 5/17/00, and 8/24/00.)

Sincerely,

Andrew Silfer/WAR

Andrew T. Silfer, P.E.
GE Project Coordinator

MPH/mbg
Attachments

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Jeffrey Bernstein, Esq., Bernstein, Cushner & Kimmel*
Public Information Repositories

(* w/attachments)

Attachment 1

Request for Proposal - 2002 OPCA Construction and Consolidation Activities

BBL[®]
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Request for Proposal

***2002 OPCA Construction
and Consolidation Activities***

**General Electric Company
Pittsfield, Massachusetts**

March 2002

BBL[®]
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

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 Section 02200 — Earthwork
 Section 02207 — Restoration of Surfaces
 Section 02212 — Topsoil, Seeding, and Mulch
 Section 02219 — Geosynthetic Drainage Composite
 Section 02222 — Soil Fill Materials
 Section 02232 — Geotextile Fabric
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 Section 02271 — Riprap
 Section 02526 — High Density Polyethylene Pipe

Attachment 1 — Technical Drawings
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 Attachment 3 — Daily Construction Activities Report Form **[Not Included]**
 Attachment 4 — Guidelines for Cleaning Incidentally PCB-Contaminated Equipment for Sale, Reuse, or Scrapping **[Not Included]**
 Attachment 5 — Technical Submittal Register

SECTION 1.0 - GENERAL INFORMATION

1.1 INTRODUCTION

Your firm is invited to submit a proposal for construction and material consolidation activities during 2002, at the Hill 78 and Building 71 On-Plant Consolidation Areas (OPCAs) located on the General Electric Company (GE) plant property in Pittsfield, Massachusetts. This Request for Proposal (RFP) addresses the construction of a portion of the Building 71 OPCA expansion and the consolidation of materials (e.g., soils, sediments, building debris, etc.) at the OPCAs that potentially contain polychlorinated biphenyls (PCBs) and other hazardous constituents. These materials have been, or will be generated as a result of ongoing environmental remediation projects performed by GE on the facility property and at nearby sites. During the consolidation activities, the selected Contractor will also be responsible for performing activities associated with maintaining the consolidation areas until final demobilization from the OPCAs as determined by GE.

All activities associated with this project, including review of this RFP, your proposal, and any work set forth in this RFP, shall be conducted in a confidential manner and should not be discussed or communicated in any manner to persons other than GE personnel without GE's prior written authorization.

Four copies of your proposal for the work identified in this RFP must be submitted to the following individuals:

Attention: Mr. John F. Novotny, P.E. (Two copies)

General Electric Company
100 Woodlawn Avenue
Building 11-250
Pittsfield, Massachusetts 01201
Telephone: (413) 494-3177
Facsimile: (413) 494-5024

Attention: Mr. William A. Rankin, P.E. (Two copies)

Blasland, Bouck & Lee, Inc.
6723 Towpath Road, P.O. Box 66
Syracuse, New York, 13214-0066
Telephone: (315) 446-2570 (x209)
Facsimile: (315) 449-4111

The deadline for submittal of proposals is **5:00 p.m.** eastern standard time on **Friday, April 12, 2002.**

1.2 REQUEST FOR PROPOSAL ORGANIZATION

This RFP has been organized into four sections, which include the following:

Section 1.0 — General Information: Provides an overview of the activities to be performed and general information for the Contractor's bidding on the work described in this RFP.

Section 2.0 — Cost Proposal and Bid Form: Describes the format each Contractor shall use to present costs associated with the activities summarized in this RFP. This section also includes the Cost Proposal Bid Form, which will be used to record all cost proposals and miscellaneous information associated with the activities summarized in this RFP.

Section 3.0 — Conditions of Work: Describes various conditions of work that are associated with the activities summarized in this RFP.

Section 4.0 — Materials and Performance Specifications: Includes Technical Specifications for acceptable levels of quality, and/or levels of performance for the construction materials.

In addition, several attachments have been included to provide supplemental information. Attachments included in this RFP are as follows: Attachment 1 includes Technical Drawings for the work identified in this RFP; Attachment 2 provides the standard form for initiating a Change Order; Attachment 3 provides a sample Daily Construction Activities Report; and Attachment 4 provides GE's Guidelines for Cleaning Incidentally PCB-Contaminated Equipment For Sale, Reuse, or Scrapping.

1.3 SCOPE OF ACTIVITIES

In general, the project will involve the following components:

- Preparation of various technical deliverables for submittal to GE;
- Performance of all necessary site preparation activities including, but not limited to the installation of access roads (including excavation and filling where necessary), erosion control measures, survey control, utility identification and protection, clearing of vegetation, and establishment of other site controls, as appropriate;
- Preparation of the subgrade for the Building 71 OPCA expansion;
- Installation of the base liner system (including a protection geotextile and sacrificial HDPE rain flap) in the Building 71 OPCA expansion;
- Installation of the leachate collection system in the Building 71 OPCA expansion;
- Consolidation of materials within, and operation of, the Hill 78 and Building 71 OCPAs at various times throughout the construction period;
- Maintenance of daily and interim covers over the consolidated materials within the OCPAs;
- Performance of site restoration activities; and
- Preparation of Record Drawings.

1.4 INTENDED USE OF REQUEST FOR PROPOSAL

GE intends to use this RFP as a basis for selecting a Contractor to perform the above-referenced activities at the Hill 78 and Building 71 OCPAs in 2002. Prospective Contractors shall bear in mind that the work activities proposed in this RFP are being performed in a phased approach. The construction of future phases of the OCPAs will occur in the upcoming years. Also, the frequency and duration of consolidation "events" in 2002 is contingent upon the generation of materials during other soil removal and building demolition activities being undertaken by GE. Lastly, Contractors shall also note that the scope of this project does not include operation of the leachate collection system or any transport and disposal activities (as they relate to consolidation materials handling). Those activities are conducted by others under separate contract.

1.5 DEFINITIONS

The following terms, as they may occur in this RFP, will be mutually understood to have the following meaning:

"Air Monitoring Contractor" refers to the Contractor who is retained by GE under a separate contract to perform air monitoring activities related to the performance of the work contained in this RFP.

"Agencies" means the United States Environmental Protection Agency (USEPA) and the Massachusetts Department of Environmental Protection (MDEP), which are the regulatory agencies overseeing this project.

"Change Order" means a written order issued by or on behalf of GE to the Contractor authorizing an addition, deletion, or revision of the work, or an adjustment in the contract price or date of completion, issued after execution of the Contract. Either the Contractor or GE can initiate the change order process. The form for initiating a change order is included as Attachment 2.

"Complete" means the proper completion of all work indicated in the Contract as determined by GE.

"Consolidation Areas" refers to the OPCAs at the GE plant property in Pittsfield, Massachusetts. The work described in this RFP pertains only to the consolidation and operation of portions of the two consolidation areas (i.e., the Hill 78 and Building 71 Consolidation Areas).

"Consolidation Material" means any soil, sediment, debris, or other material delivered to the consolidation areas (by others), for placement within the consolidation area. Consolidation material may contain PCBs and/or possibly other hazardous constituents. Such materials must be handled in accordance with the requirements of the Toxic Substance Control Act (TSCA), the Resource Conservation and Recovery Act (RCRA), Occupational Safety and Health Administration (OSHA) Standards, and all other applicable federal, state, and local requirements.

"Contract" or "Contract Document" consists of the following documents:

1. GE Contract Agreement
2. RFP
3. Technical Drawings
4. Addenda
5. Change Orders

"Contract Price" means the contract price set forth in the completed GE Contract Agreement.

"Contractor" means the party submitting a proposal, selected by GE, and ultimately entering into a Contract with GE to perform the consolidation activities discussed in this RFP. "Contractor" also means any subcontractors employed by the Contractor.

"Design Engineer" means the person or persons responsible for the design aspects of the project. For this project, the Design Engineer is Blasland, Bouck & Lee, Inc. (BBL) with headquarters in Syracuse, New York.

"GE" means the General Electric Company, Pittsfield, Massachusetts.

"GE's Representative" is a representative(s) of GE who will serve as the liaison between the Contractor and GE. GE's Representative(s) will be present at various times during the period that the work activities are performed. However, only the Project Coordinator (defined below) has the authority to execute the Contract and any change orders.

"Project Coordinator" means the following individual, who has the authority to execute the Contract and any Change Orders on behalf of GE: Mr. John F. Novotny, P.E.

"Substantial Completion" means completion of the work to a level at which all critical components of the work outlined in this RFP are completed and are operable/usable as determined by GE.

"Supervising Contractor" means the person or persons designated by GE to represent GE on quality assurance/quality control (QA/QC) aspects of the project. For this project, the Supervising Contractor is Mr. James M. Nuss, P.E., L.S.P.

1.6 CONTRACTOR QUALIFICATIONS AND INSURANCE REQUIREMENTS

GE may make such investigation, as it deems necessary, to determine the qualifications of the Contractor to perform the work; the Contractor will furnish to GE all information and data for this purpose as GE may request. GE reserves the right to reject any proposal if the evidence submitted by, or investigation of, such Contractor fails to satisfy GE that such Contractor is properly qualified to carry out the obligations of the Contract, and to complete the work contemplated therein. Conditional Bids will not be accepted.

Evidence of insurance must be submitted with the proposal. The minimum insurance requirements for the Contract are as follows:

(1) Worker's Compensation	Statutory
(2) Employer's Liability	\$1,000,000 per each occurrence and \$2,000,000 aggregate
(3) Automobile Liability	\$1,000,000 per occurrence combined single limit for Bodily Injury and Property Damage Liability
(4) General Liability	\$1,000,000 per occurrence/\$1,000,000 aggregate
(5) Pollution Liability	\$1,000,000 per claim/\$1,000,000 aggregate

The Contractor's certificate of insurance shall indicate the minimum types and limits of insurance that have been procured and state that coverage shall be primary to any coverages carried by GE. Coverages under Items 3 and 4 shall be provided on an "occurrence" rather than "claims-made" form. The Contractor shall cause its insurers to provide GE with a minimum of 30 days written notice prior to the effective date of any cancellation of, or diminution in the coverage provided by, any and all such policies. Such certificate shall name GE as an additional insured on all policies except Worker's Compensation, Employer's Liability, and any Professional Liability Policy.

The Contractor shall also provide a waiver of subrogation under its General Liability, Automobile Liability, and Worker's Compensation Policies in favor of GE.

1.7 BONDS FOR PERFORMANCE AND LABOR AND MATERIALS PAYMENT

Prior to signing the Contract and within five days after the award of the Contract, respectively, GE will require the Contractor to furnish bonds as follows: (a) Covering the faithful performance of the Contract in the amount equal to one hundred percent of the Contract; and (b) Covering the payment of all obligations arising thereunder in the amount equal to one hundred percent of the Contract.

The surety on such bonds must be a duly authorized surety company satisfactory to GE and must include a certificate executed by an officer of the surety issuing the bond stating that all premiums for the bond have

been paid in full. ALL BOND PREMIUMS MUST BE PAID BY THE CONTRACTOR. These bonds will remain in force for a minimum period of 12 months after completion of all work by the Contractor.

GE, at its option, may not require the Contractor bonds; therefore the cost of the bonds must be stipulated within the Contractor's Proposal. Such costs can then be used to determine the cost savings to GE if bonds are not required.

1.8 PRE-BID MEETING AND SITE VISIT

A mandatory pre-bid meeting and site visit will be conducted with prospective Contractors at **10:00 a.m.** eastern standard time on **Thursday, April 4, 2002**. As part of the Site Visit, prospective Contractors will have the opportunity to inspect both OCPAs and surrounding areas. With the exception of the Pre-Bid Meeting and Site Visit, prospective Contractors shall not, under any circumstances, walk, drive, or otherwise access the work sites without GE's prior authorization. Furthermore, prospective Contractors shall not contact the Agencies for any purpose whatsoever.

Any Subcontractors attending the Pre-Bid Meeting and Site Visit must sign a Confidentiality Agreement prior to attending the meeting. Requests for additional Confidentiality Agreements can be made by contacting Mr. William Rankin at (315) 446-2570, ext. 209.

A copy of the fully executed Confidentiality Agreement signed by each Contractor and GE will be returned to each Contractor attending the Pre-Bid Meeting and Site Visit.

Any requests for additional information or site visits, if desired, should be coordinated with GE's Project Coordinator at (413) 494-3177.

1.9 PROPOSAL INSTRUCTIONS

A completed proposal must include one original, signed Cost Proposal Bid Form. The Cost Proposal Bid Form is contained in Section 2.4 of this RFP, and all entries must be typed or filled in with ink. If the proposal is made by a corporation, the official corporation name must be given, the proposal signed by an authorized officer of the corporation, and the corporate seal affixed. If the proposal is made by a partnership, the official name as it appears on the Assumed Name Certificate must be given and the proposal signed by a partner. If the proposal is made by a sole proprietorship, the proposal must be signed by the individual owner. Names and titles of all persons signing must be typed or printed below their signatures. All attachments, certifications, or acknowledgments attached to the proposal form must be executed in the same manner as the proposal.

In addition, the following items are also required to be submitted in response to this RFP:

- Contractor rates in accordance with General Information Section 1.11 — Contractor Rates;
- Original copy of Contractor's Insurance Certificate, dated one week prior to submitting the Contractor's proposal;
- List of proposed subcontractors in accordance with General Information Section 1.12 — Subcontractors; and
- Identification of source(s) of imported fill materials to be used.

At its discretion, GE may consider informal any proposal not prepared and submitted in accordance with the provisions hereof and may reject any or all proposals. Any proposal may be withdrawn by GE prior to the

deadline for submittal of proposals (or authorized postponement thereof). Any proposal received after the time and date specified will not be considered unless GE, in its sole discretion, decides otherwise.

At the time of the opening of proposals, it will be presumed that each Contractor has inspected the site, and has read and is thoroughly familiar with this RFP. The failure or omission of any Contractor to examine any form, instrument, or document will in no way relieve any Contractor from any obligation in respect to its proposal.

1.10 PROJECT SCHEDULE

For the purposes of developing a proposal for the performance of this Contract, the Contractor should assume that the Contract for this project will be awarded on or about **April 22, 2002**, and that mobilization to the work site(s) shall occur by **May 6, 2002**.

Time is of the essence. The timeframe to complete the construction and consolidation activities outlined in this RFP has been established by the performance of other remediation projects in Pittsfield being performed by GE, as well as deadlines established by the Agencies. In light of this, a date of substantial completion for construction of the Building 71 OPCA expansion has been established as November 1, 2002; a date of substantial completion for the consolidation of materials at the Building 71 and Hill 78 OPCAs has been established as December 31, 2002. However, this timeframe may be changed by GE, based on weather conditions and/or potentially limiting factors that may affect ongoing remediation activities and thus the generation of materials for consolidation at the OPCAs. Operational-related activities will commence at the initiation of material delivery to the site.

GE will withhold final payment until such time that all work activities have been completed to the satisfaction of GE. In accordance with Section 3.7 of the Conditions of Work, the Contractor will be required to prepare and periodically update a project schedule.

1.11 CONTRACTOR RATES

In responding to this RFP, Contractors must provide their most current hourly labor rates and hourly, daily, weekly, and monthly equipment rental rates. GE will use these schedules as a basis for evaluating any contract price increases or decreases in response to change orders or out-of-scope services, when GE approves such work. In addition, as previously indicated, Contractors shall acknowledge that the labor rates and equipment rental rates submitted to GE will be valid for one calendar year beginning on the date the GE Contract is executed.

1.12 SUBCONTRACTORS

The proposal must include a list of all subcontractors proposed for use in the work. This list will be considered in evaluating the proposals and will be deemed to be a condition of the Contract, and no addition of a subcontractor will be permitted without the prior approval of GE. GE's only contractual relationship, however, will be with the Contractor itself.

1.13 ADDENDA

No interpretation of the meaning of the RFP will be made orally. Requests for such interpretation must be addressed to GE, Attention: Mr. John F. Novotny, P.E., 100 Woodlawn Avenue, Building 11-250, Pittsfield, Massachusetts 01201, (413) 494-5024 (fax) or at John.Novotny@corporate.ge.com (e-mail). To be given consideration, all requests must be received at the above address by **5:00 p.m.** eastern standard time on **April 8, 2002**. Any and all such interpretations and any supplemental instructions will be in the form of written addenda, which will be sent to all holders of the RFP to be received no later than **5:00 p.m.** eastern standard time on **April 10, 2002**. Failure of any Contractor to acknowledge receipt of any such addenda will not

relieve said Contractor from any obligation under its proposal as submitted. All addenda so issued will become part of this RFP.

1.14 PRECEDENCE

In the case of identified discrepancies among any components of the RFP or the final Contract Documents, the Contractor will provide notice to GE. Unless otherwise directed, precedence among the components of the Contract Documents will be in the following order:

1. Change Orders;
2. GE's Contract Agreement;
3. Addenda (later dates taking precedence over earlier dates);
4. Conditions of Work;
5. Technical Drawings;
6. Cost Proposal Form and Bid Form;
7. General Information; and
8. Technical Specifications.

- END OF SECTION -

SECTION 2.0 - COST PROPOSAL AND BID FORM

2.1 INTRODUCTION

As compensation for performing the activities summarized in this RFP, GE will reimburse the selected Contractor in accordance with the terms in this section of the RFP, as well as the Contract Agreement to be executed between GE and the selected Contractor.

In completing the Cost Proposal Bid Form (Section 2.4), the Contractor acknowledges and states that all labor, equipment, materials, subcontractor fees, taxes, expenses, permits, and any other costs incurred by the Contractor and any subcontractors are included in the cost proposal for each cost proposal item, and that the cumulative costs of the separate cost proposal items represent all of the activities and materials provided or coordinated by the Contractor and any subcontractors. In addition, the Contractor acknowledges that the descriptions provided in this section are general and do not necessarily include all activities associated with a given cost proposal item. Other components of this RFP provide additional and/or appropriate details for executing this Contract. Also, the selected Contractor is responsible for visiting the site and field verifying locations, depths, sizes, materials of construction, and any other relevant information related to existing structures affected by the proposed activities.

2.2 FORMAT

The remainder of this section is presented in two sections. The purpose and content of each section are briefly described as follows:

Section 2.3 - Cost Proposal: Describes the format of the requested cost proposal for the work, including a general description of the work activities to be included with each bid item.

Section 2.4 - Cost Proposal Bid Form: Includes the form on which the Contractor is to provide the following:

- Cost proposals for the various components related to the work of this RFP;
- Proposed subcontractor(s) and backfill source(s) to be used for the work; and
- Acknowledgment that all addenda have been received and authorization to execute the Cost Proposal Bid Form.

2.3 COST PROPOSAL

This section describes the cost proposal format and summarizes the various components of the work that are included under this RFP (and described in greater detail throughout this RFP). In general, the bid items for the work of this RFP include lump sum proposals to perform six different work tasks based on the anticipated scope and quantities provided in this RFP.

The bid for each cost item (to be filled in by the Contractor in Section 2.4) should be developed as a "stand-alone" cost. To allow for a common basis for developing cost proposals, the Contractor shall use the volume estimates provided in this RFP for the material consolidation periods. Deviations in this estimate compared to the actual in-place volumes will be reimbursed on an add/deduct basis. There should be no change in the project schedule, or additional fees to complete the scope of work defined by this RFP, nor should there be any redundant fees among the various bid items. The Contractor should use the information presented below, as further detailed in other sections of this RFP (e.g., the Conditions of Work, Materials and

Performance Specifications and Drawings, etc.), and as modified by any addenda, as a basis for cost proposal development.

Lump Sum Cost Items

The Contractor shall develop separate lump sum cost proposals for each of the five specified work tasks (i.e., Items A through E below). For each work task, the bids shall include all costs associated with the performance of the following work activities based on the scope of work and limits specified in this RFP. GE reserves the right to request additional unit cost detail or revision to the breakdown at any time during the project, including prior to selecting a Contractor, and may request all documentation (e.g., spreadsheets, worksheets, tables, etc.) generated during the preparation of the lump sum cost proposals. At a minimum, cost breakdowns must be clearly indicated for each bid item. The breakdown must include a complete list of work activities, unit costs, assumed quantities, and extended bid costs (determined by multiplying the unit cost by the assumed quantity). Sufficient detail must be provided to allow for payment modifications as discussed in Section 3.24. Costs presented in the breakdown (and in any revisions) must be equal to the total lump sum price for each bid item.

A. Pre-Mobilization Submittals

Prior to initiating any on-site activities, the selected Contractor will be responsible for preparing various submittals. These submittals include an Operations Plan (Section 3.4), Health and Safety Plan (Section 3.5), a Contingency Plan (Section 3.6), Work Schedule (Section 3.7), samples of backfill materials from proposed source locations (Section 3.28), and other submittals as specified in Section 3.0 of this RFP. These submittals will be developed by the Contractor based on the current site conditions and discussions with GE. Additional information regarding the scope of this work task, as well as the basis for developing a cost proposal is presented in Section 3.0 of this RFP.

B. Construction Support Activities

This component includes all work performed prior to, during, and following construction activities, excluding those identified in Part A above. For office-based activities, this component includes, but is not limited to, the following:

- Attendance at all project meetings;
- Identification and acquisition of construction-related (i.e., non-environmental) permits that may be necessary during construction and/or restoration activities;
- Procurement and coordination of subcontractors (e.g., surveyors, landscapers, etc.) and equipment as necessary to perform the work;
- Restoration of any items disturbed by the performance of the work and not otherwise addressed by this RFP (e.g., parking areas, material and equipment staging areas, field trailer locations, etc.);
- Preparation of, and revisions to Work Schedules and other required documentation;
- Compliance with all applicable federal, state, and local regulations and requirements; and
- All other office and administration services necessary to support the Contractor's activities for the duration of the project.

This component also includes several support/operational/maintenance activities required of the Contractor during the execution of the Contract including, but not limited to, the following:

- Mobilization(s) and demobilization(s) of personnel, equipment, and materials to the work site;
- Provision of office equipment within the GE-provided field trailer for the duration of the project;
- Provision, service, and maintenance of a portable sanitary facility at the work site;
- Installation and maintenance of temporary access roads, gravel tracking pads, and equipment and materials staging/cleaning areas to support work activities;
- Construction of an equipment cleaning area consisting of an impermeable barrier sloped to a collection sump;
- The Contractor must not track soil, mud, or dust on to private/public roadways (i.e., the Contractor must utilize gravel tracking pads, access roads, and clean tires of transport vehicles prior to exiting the work site, etc.);
- Installation and maintenance of temporary fencing and other site security measures;
- Clearing vegetation as required to access the work area(s) and perform the work;
- Abandonment, removal, relocation, and/or replacement of structures (e.g., tarps, ditches, fences, etc.) as required to perform the work;
- Provision of erosion and sedimentation control measures and associated monitoring/maintenance;
- Coordination of all site activities with the GE Project Coordinator, GE's Representative(s), the Air Monitoring Contractor, additional Contractors as necessary, and any Agency Representatives;
- Health and safety monitoring and control measures;
- All required survey measurements;
- Noise and dust control measures;
- Protection of existing structures (e.g., water supply wells, monitoring wells, manholes, fencing, etc.) not affected by the work;
- Safely directing transport vehicles to and from city streets onto the work site;
- Delivery, set-up, and use of a personnel cleaning area;
- On-site delivery and placement of clean, GE-approved materials to achieve the specified grades and elevations for site restoration;
- Restoration of surface features, including parking lots, grass areas, materials and equipment staging areas, fences, and other surface features to their original locations and elevations, proposed final configurations, or to requested and GE-approved alternate locations and

elevations. The Contractor will be responsible for ensuring that all surfaces are restored to prevent surface water ponding and to promote positive surface drainage; and

- All other labor, equipment, materials, subsistence, and related activities associated with daily construction activities (including maintenance operations).

C. Building 71 Expansion Base Liner System Installation

This component includes all work associated with installing a base liner system at the Building 71 OPCA expansion in accordance with the Materials and Performance Specifications and Technical Drawings of this RFP. The activities associated with base liner system installation generally include, but are not limited to, the following:

- Excavating, filling, grading, and compaction of the area to the specified grades, lines, and levels;
- Removal of all large and deleterious materials from the subgrade surface, including the area in the northeast portion of the Building 71 expansion area containing wood chips/mulch. Materials shall be placed within the Building 71 OPCA;
- Removal of boulders (buried up to 6' below the existing surface grade) previously deposited in an excavated area within the Building 71 expansion footprint and backfilling the excavation (see Technical Drawing 3) and placement of the boulders at other locations on the site approved by GE;
- Removal of existing chain-link fence (where necessary);
- Construction of earthen berms to support liner system construction;
- Placement and compaction of a six-inch thick layer of GE-approved subbase material;
- Excavating and backfilling an anchor trench along the perimeter of the Building 71 OPCA expansion;
- Installation of a non-woven geotextile along the northern embankment/berm of the Building 71 OPCA expansion;
- Installation of the base liner system at the Building 71 OPCA expansion;
- Installation of leachate collection piping (including gravel cover) and associated fittings;
- Installation of a protection geotextile over all exposed geosynthetic drainage composite (GDC) to protect the upper geotextile of the GDC from ultraviolet degradation;
- Installation of a sacrificial HDPE rain flap; and
- Surveying final conditions to provide accurate as-built drawings, including slope break points, pipe location and invert elevations, and liner system termination information.

D. Material Consolidation Within the Hill 78 OPCA

This component includes the following items:

- Provision and operation of labor, equipment, and materials necessary to consolidate and manage materials off-loaded by others within the Hill 78 OPCA in 2002. Materials are expected to generally consist of soils and sediments excavated from the Housatonic River (specifically, during the ½-Mile Reach Removal Action and 1½-Mile Reach Removal Action), as well as demolition debris generated from the Building 33 and 34 Complexes. Consolidation activities are anticipated to consist of a summer (June/July) and fall (October/November) placement event.

Materials generated from the ½-Mile Reach Removal Action are anticipated to be consolidated as part of the summer placement event (commencing on or about July 1, 2002). For bidding purposes only, the Contractor shall assume that 3,800 cy of materials will be generated from the ½-Mile Reach Removal Action activities in 2002, and consolidated as part of the **summer** placement event. Materials generated from the 1½-Mile Reach Removal Action, as well as demolition debris generated from the Building 33 and 34 Complexes are anticipated to be consolidated as part of the **fall** placement event (commencing on or about November 1, 2002). For bidding purposes only, the Contractor shall assume that 11,300 cy of materials will be generated from both the 1½-Mile Reach Removal Action activities and the Building 33 and 34 Complexes demolition activities in 2002, and consolidated as part of the fall placement event.

The Contractor shall note that these are pre-consolidation volume estimates.

Depending on several factors, these materials may have to be immediately transferred to the OPCAs upon their generation (i.e., stockpiling at the removal area may not be an option). The contractor shall have equipment and manpower available at the OPCA (within three business days notice by GE) for consolidation of any material in the OPCA. All loading, transporting to the OPCA, and off-loading of these materials will be performed by others under separate contract with GE.

Following the completion of each consolidation event (i.e., summer and fall) in 2002, as-built survey data (obtained by the Contractor) will be used to determine the actual in-place volume of materials consolidated at the Hill 78 OPCA. The actual in-place volume of materials consolidated at the Hill 78 OPCA, as determined from as-built survey data, will be used as the sole basis for payment. Contractor shall note that although a pre-construction survey has been performed by others (refer to Technical Drawing 1 – Existing Site Conditions), any noted discrepancies shall be brought to GE's attention and addressed accordingly. **The Contractor shall account for all mixing of materials, settlement, compaction, and all other volume-reducing factors when developing its cost proposals. It should also be noted that the Contractor may (at its option and its cost) perform a pre-consolidation survey to verify the existing conditions at each OPCA.** Any deviations must be brought to the attention of GE for resolution before any material is consolidated within the OPCA.

- Moisture conditioning (e.g., aerating, wetting, etc.) of soil materials delivered to the OPCA, as necessary, to provide an optimum condition for compaction. Materials delivered to the OPCA will not contain free liquids. The Contractor is required to condition the material such that a firm, stable surface, capable of supporting construction equipment, is developed following compaction.
- Segregation (to minimize voids and optimize compaction), placement, and compaction of consolidation materials received by others in the area designated on the Technical Drawings. Compaction shall be performed using either a vibratory sheepfoot or smoothdrum roller, with five passes performed for each lift of consolidation material placed (lifts shall not exceed one foot in thickness). Slope angles shall not exceed 3 horizontal to 1 vertical (3:1). All materials delivered to the OPCA larger than one foot in diameter shall be placed within the material lift such that the object is fully supported on all sides (i.e., no voids exist around the object). No

stacking or nesting of large objects will be allowed. Any rubber tires shall be consolidated within an area at least 25 feet from the edge of the OPCA perimeter.

- Installation and anchorage of a polyethylene cover (i.e., daily cover) over all exposed consolidation materials when active consolidation activities are not occurring (note: the existing tarpaulins, polyethylene liners, and tires currently being used at the OPCA can be reused as daily covers [clean side up]).
- Implementation of erosion, noise, and dust control measures as required.
- Construction of additional equipment cleaning areas (as necessary).
- Inspection and cleaning of all transport vehicles prior to exiting the site, including management of any cleaning fluids generated by this process.
- Cleaning all equipment that contacts the consolidation materials prior to its use in a "clean" area and prior to its removal from the site.
- Inspection and maintenance/repair of the consolidation areas and any mitigating measures, including erosion control items, daily and interim covers, etc., during the course of the contract.
- Completion and provision of daily activity logs (provided to GE on every Monday for the prior week's activities), including the following information:
 - date;
 - weather and temperature;
 - description of the activities performed;
 - list of the equipment and labor used;
 - estimate of the amount of materials consolidated on that date based on the number of trucks;
 - description of the materials (including type, composition, and source) consolidated on that date; and
 - description of any problems encountered, and the mitigative measures implemented.

An example of a Daily Construction Activities Report is included in Attachment 3.

E. Material Consolidation Within the Building 71 OPCA

This component includes the following items:

- Provision and operation of labor, equipment, and materials necessary to consolidate and manage materials off-loaded by others within the Building 71 OPCA in 2002. Materials are expected to generally consist of soils and sediments excavated from the Housatonic River (specifically, during the ½-Mile Reach Removal Action and the 1½-Mile Reach Removal Action). Consolidation activities are anticipated to consist of a summer (June/July) and fall (October/November) placement event.

Materials generated from the ½-Mile Reach Removal Action are anticipated to be consolidated as part of the summer placement event (commencing on or about July 1, 2002). For bidding purposes only, the Contractor shall assume that 1,600 cy of materials will be generated from the ½-Mile Reach Removal Action activities in 2002, and consolidated at the Building 71 OPCA as part of the **summer** placement event. Materials generated from the 1½-Mile Reach Removal Action are anticipated to be consolidated as part of the fall placement event (commencing on or about November 1, 2002). Once again, for bidding purposes only, the Contractor shall

assume that 700 cy of materials will be generated from the 1½-Mile Reach Removal Action activities, and consolidated in 2002 as part of the **fall** placement event. **The Contractor shall note that these are pre-consolidation volume estimates.**

Depending on several factors, these materials may have to be immediately transferred to the OPCAs upon their generation (i.e., stockpiling at the removal area may not be an option). The contractor shall have equipment and manpower available at the OPCA (within three days notice by GE) for consolidation of any material in the OPCA. All loading, transporting to the OPCA, and off-loading of these materials will be performed by others under separate contract with GE.

Following the completion of each consolidation event (i.e., summer and fall) in 2002, as-built survey data (obtained by the Contractor) will be used to determine the actual in-place volume of materials consolidated at the Building 71 OPCA. The actual in-place volume of materials consolidated at the Building 71 OPCA, as determined from as-built survey data, will be used as the sole basis for payment. Contractor shall note that although a pre-construction survey has been performed by others (refer to Technical Drawing 1 – Existing Site Conditions), any noted discrepancies shall be brought to GE's attention and addressed accordingly. **The Contractor shall account for all mixing of materials, settlement, compaction, and all other volume-reducing factors when developing its cost proposals. It should also be noted that the Contractor may (at its option and its cost) perform a pre-consolidation survey to verify the existing conditions at each OPCA.** Any deviations must be brought to the attention of GE for resolution before any material is consolidated within the OPCA.

- Moisture conditioning (e.g., aerating, wetting, etc.) of soil materials delivered to the OPCA, as necessary, to provide an optimum condition for compaction. Materials delivered to the OPCA will not contain free liquids. The Contractor is required to condition the material such that a firm, stable surface, capable of supporting construction equipment, is developed following compaction.
- Segregation (to minimize voids and optimize compaction), placement, and compaction of consolidation materials to the grades shown on the Technical Drawings. Compaction of the material placed within the consolidation area shall be performed using either a vibratory sheepsfoot or smoothdrum roller, with five passes performed for each lift of consolidation material placed (lifts shall not exceed one foot in thickness). All materials delivered to the OPCA larger than one foot in diameter shall be placed within the material lift such that the object is fully supported on all sides (i.e., no voids exist around the object). No stacking or nesting of large objects will be allowed. Any rubber tires shall be consolidated within an area at least 25 feet from the edge of the OPCA perimeter.
- Installation and anchorage of a polyethylene cover (i.e., daily cover) over all exposed consolidation materials when active consolidation is not occurring (note: the existing tarpaulins, polyethylene liners, and tires currently being used at the OPCA can be reused as daily covers [clean side up]);
- Implementation of erosion, noise, and dust control measures as required.
- Construction of a gravel equipment cleaning pad within the Building 71 OPCA for cleaning all equipment that has been in contact with consolidation materials prior to its use in a "clean" area, and prior to its removal from the site.
- Inspection and cleaning all transport vehicles prior to exiting the site, including management of any cleaning fluids generated by this process.

- Cleaning all equipment that contacts the consolidation materials prior to its use in a "clean" area and prior to its removal from the site.
- Inspection and maintenance/repair of the consolidation areas and any mitigating measures, including erosion and water control items, daily and interim covers, etc., during the course of the contract.
- Completion and provision of daily activity logs (provided to GE on every Monday for the prior week's activities), including the following information:
 - date;
 - weather and temperature;
 - description of the activities performed;
 - listing of the equipment and labor used;
 - estimate of the amount of materials consolidated on that date (based on the number of trucks, if applicable);
 - description of the materials (including type, composition, and source) consolidated on that date; and
 - description of any problems encountered, and the mitigative measures implemented.

Unit Price Cost Items

F. Interim Cover Installation

• Soil Cover

The Contractor will be required to install an interim soil cover over the Hill 78 and Building 71 OPCAs at the end of consolidation activities. The interim soil cover will include the installation (including seeding and mulch), and all necessary monitoring and maintenance, of a 3-inch-thick layer (measured after compaction) of GE-approved clean soil over the consolidation materials at the completion of the consolidation activities, or at GE's direction. All tarpaulins shall be folded and placed in a storage area approved by GE.

• Tarpaulin Cover

If consolidation activities extend beyond October 15, 2002, or at GE's direction, the polyethylene cover system used actively during the consolidation activities (i.e., tarps) shall be utilized as the interim cover during the winter months. **The Contractor shall replace all tarpaulins exhibiting any signs of deterioration (e.g., holes, rips, thinning, etc.). Payment for the tarpaulin cover system will be based on the in-place square yardage of installed tarpaulins (i.e., overlapping of tarpaulins will not be accounted for), determined from the Contractor's survey data.** The tarpaulins shall be a minimum of 6-mils thick and anchored along the entire perimeter of the tarped area in a six-inch wide by six-inch deep trench. All tarpaulin installation shall be performed when GE's Representative is on-site to document the installation procedures.

Costs indicated on the Cost Proposal Bid Form should include all work described in the Materials and Performance Specifications, shown on the Technical Drawings, indicated in this RFP, or otherwise required to meet the intent of the project. The above work descriptions are provided solely as additional information regarding the general scope and magnitude of the project. The descriptions do not necessarily encompass all construction activities necessary to complete the work described in this RFP. Additional work activities specified elsewhere in this RFP, required in the Materials and Performance Specifications, depicted on the Technical Drawings, or otherwise necessary to complete the construction shall be considered when developing the cost proposal. Also, the Contractor shall note that a **5 percent retainage** will be held by GE on each of the Contractor's invoices. The retainage will be released upon completion of all work to the satisfaction of GE.

[REMAINDER OF PAGE LEFT INTENTIONALLY BLANK]

Contractor: _____ Date: _____

2.4 COST PROPOSAL BID FORM

A. **Pre-Mobilization Submittals** \$ _____ Lump Sum
(Not to exceed 10 percent of the Total Lump Sum Contract Price)

B. **Construction Support Activities** \$ _____ Lump Sum

C. **Building 71 Expansion Base Liner System Installation** \$ _____ Lump Sum

D. **Material Consolidation Within Hill 78 OPCA (summer)** \$ _____ Lump Sum
(For estimated volume of materials to be consolidated during the summer placement event; see Section 2.3D)

Add/Deduct \$ _____ Per In-Place Cubic Yard
(For each cy less than/more than the estimated volume up to 5,000 cy)

Add/Deduct \$ _____ Per In-Place Cubic Yard
(For each cy less than/more than the estimated volume between 5,000 cy and 10,000 cy)

Material Consolidation Within Hill 78 OPCA (fall) \$ _____ Lump Sum
(For estimated volume of materials to be consolidated during the fall placement event; see Section 2.3D)

Add/Deduct \$ _____ Per In-Place Cubic Yard
(For each cy less than/more than the estimated volume up to 5,000 cy)

Add/Deduct \$ _____ Per In-Place Cubic Yard
(For each cy less than/more than the estimated volume between 5,000 cy and 10,000 cy)

E. **Material Consolidation Within Building 71 OPCA (summer)** \$ _____ Lump Sum
(For estimated volume of materials to be consolidated during the summer placement event; see Section 2.3E)

Add/Deduct \$ _____ Per In-Place Cubic Yard
(For each cy less than/more than the estimated volume up to 5,000 cy)

Add/Deduct \$ _____ Per In-Place Cubic Yard
(For each cy less than/more than the estimated volume between 5,000 cy and 10,000 cy)

Material Consolidation Within Building 71 OPCA (fall) \$ _____ **Lump Sum**
(For estimated volume of materials to be consolidated during the fall placement event; see Section 2.3E)

Add/Deduct \$ _____ **Per In-Place Cubic Yard**
(For each cy less than/more than the estimated volume up to 5,000 cy)

Add/Deduct \$ _____ **Per In-Place Cubic Yard**
(For each cy less than/more than the estimated volume between 5,000 cy and 10,000 cy)

F. Interim Cover Installation

Soil Cover \$ _____ **Per In-Place Cubic Yard**

Tarpaulin Cover \$ _____ **Per In-Place Sq. Yard**

TOTAL (excluding Add/Deduct and Unit Cost pricing): \$ _____ **Lump Sum**

Proposed Subcontractor(s) and Soil Fill Source(s)

The Contractor proposes to use the subcontractor(s) and soil fill source(s) identified below for the performance of this work. No substitutions may be made without prior written approval from GE. (Use additional sheets as necessary.)

Subcontractor

General Work Activities

Contractor: _____ **Date:** _____

Proposed Soil Fill Source(s)

Cost of Bonds Required in Section 1.9

Cost Credit if Contractor uses GE's Equipment Decontamination Area (see Section 3.27)

Contractor Acknowledgment and Authorization of Cost Proposal

The Contractor acknowledges that it has examined the RFP (Contract Documents) and has attended the pre-bid meeting and site visit. By signing this Cost Proposal Bid Form, the Contractor acknowledges that it and any subcontractors are appropriately qualified and licensed to perform the work, understand all of the conditions of work, and waive all right to plead any misunderstanding regarding the same.

The Contractor acknowledges the receipt of the following written addenda issued following receipt of the RFP (enter "none" if applicable).

Addendum No.	Addendum Date	General Subject

As stated above, the selected Contractor will be bound by all issued Addenda, whether or not acknowledged herein. In submitting the Cost Proposal Bid Form, the Contractor acknowledges and warrants that the cost proposal is for all of the work described herein, and the cost proposal entries (lump sum or other) cover and include full compensation, including all applicable local, state, and federal taxes to the Contractor for the performance of each obligation imposed by the Contract. The Contractor further acknowledges and agrees that the cost proposal entries provided herein are valid for the duration of this project, provided that the project is performed within one calendar year from the date of the signature of the Contract.

This Cost Proposal Bid Form executed this _____ day of _____ 2002.

Contractor: _____ License No.: _____

By: _____ Federal ID No.: _____

Title: _____

-END OF SECTION -

SECTION 3.0 - CONDITIONS OF WORK

3.1 PROJECT REQUIREMENTS

3.1.1 REGULATORY REQUIREMENTS

The execution of this Contract shall comply with all federal, state, and local regulations and guidance. The Contractor shall be familiar with and adhere to all applicable regulations, and shall be subject to requirements of such whether specifically addressed herein or not. Such local, state, and federal regulations and guidelines include, but may not be limited to, the following:

<u>REGULATION</u>	<u>TOPIC</u>
40 CFR 761 (TSCA)	Handling, Treatment, Storage, Transportation, and Disposal of PCB-Containing Materials
40 CFR 260-267 (RCRA)	Hazardous Waste Management Regulations
29 CFR 1910 and 1926	OSHA Standards
CFR Title 49	Department of Transportation (DOT) Requirements
310 CMR 30.0000	Massachusetts Hazardous Waste Regulations
310 CMR 40.0000	Massachusetts Contingency Plan (MCP)

The Contractor will be obligated to meet the requirements of applicable environmental permits (to be obtained by GE) and/or regulations.

The Contractor shall obtain all other permits that may be required under local jurisdictions. These permits include, but are not necessarily limited to, those related to work within public roadways (Section 3.14), building permits, and zoning regulations.

3.1.2 SITE REQUIREMENTS

In October 1999, a Consent Decree (CD) executed by GE, the Agencies, and several other government agencies was lodged in the United States District Court for the District of Massachusetts. The Court entered the CD on October 27, 2000. The CD governs (among other things) the performance of construction activities to address polychlorinated biphenyls (PCBs) and other hazardous constituents in soils, sediment, and groundwater in several areas at and near Pittsfield, Massachusetts that collectively comprise the GE-Pittsfield/Housatonic River Site.

As a requirement of the CD, GE prepared a Project Operations Plan (POP) to ensure that construction activities were performed in a manner that supports the attainment of the applicable performance standards for each construction site.

The POP comprises a series of topic-specific plans (identified below) that address several common aspects of construction activities and apply to various activities to be conducted as part of those construction activities, ranging from initial pre-design activities (i.e., field sampling) to the performance and completion of the construction activities. Collectively, these plans describe the minimum requirements, general

activities, protocols, and methodologies that are applicable to construction activities (outside of the Housatonic River). The following plans comprise the POP:

- Field Sampling Plan/Quality Assurance Project Plan;
- Site Health & Safety Plan;
- Waste Characterization Plan;
- Soil Cover/Backfill Characterization Plan;
- Site Management Plan;
- Ambient Air Monitoring Plan;
- Construction Quality Assurance Plan; and
- Contingency and Emergency Procedures Plan.

The requirements established in these plans that are applicable to the construction/demolition activities considered in this RFP must be adhered to by the selected contractor. The above-listed plans are available for review by prospective contractors at the GE facility in Pittsfield during the bidding period. A copy of each plan can be provided to the selected contractor at its request following the award of Contract.

3.2 SUBMITTALS

The Contract requires the submittal of various plans, documents, data, drawings, and other information related to the performance of construction activities. For those submittals required after contract award (e.g., Operations Plan, Health and Safety Plan, Contingency Plan, shop drawings, etc.), or unless otherwise indicated, five copies of each submittal (numbered in sequential order as submitted) should be submitted to the following individuals:

Attention: John F. Novotny, P.E. (Two copies)
General Electric Company
100 Woodlawn Avenue
Pittsfield, Massachusetts 01201
Telephone: (413) 494-3177

Attention: William A. Rankin, P.E. (Three copies)
Blasland, Bouck & Lee, Inc.
6723 Towpath Road, P.O. Box 66
Syracuse, New York, 13214-0066
Telephone: (315) 446-2570 (x209)

These submittals (with the exception of the Record Drawings) must be received prior to the Contractor's mobilization to the site or seven days prior to the Contractor's intended use of the item covered by the submittal, as appropriate. GE's Representative will subsequently review the submittals to determine general compliance with the Contract conditions. GE Representative's review will not be a complete check of the detailed methods, materials, or procedures and shall not be construed as permitting any departure from the Contract, except where the Contractor has previously requested and received written approval from GE for such departure. The Contractor will not be permitted to undertake any activity that is directly or indirectly related to the item covered by the submittal until such time that GE provides notification to the Contractor.

Submitted data will be reviewed and stamped by GE's Representative as follows:

- "Reviewed" if no objections are observed or comments made.
- "Reviewed and Noted" if minor objections, comments, or additions are made but resubmittal is not considered necessary.

- "Resubmit" if the objections, comments, or additions are extensive, or if transmittal to another Contractor is required. In this case, the Contractor must resubmit the items after correction, and the same number of copies must be included in the resubmittal as in the first submittal. The Contractor will not be permitted to perform any activity that directly or indirectly involves the item covered by the submittal until a "Reviewed" or "Reviewed and Noted" stamp is provided by GE's Representative.
- "Rejected" if the submittal under consideration is not, even with reasonable revision, acceptable, or when the data submitted are not sufficiently complete to establish compliance with the Contract Conditions. In this case, the Contractor must resubmit a new or modified submittal, which meets the scope and intent of the work specified in the Contract. The Contractor will not be permitted to perform any activity that directly or indirectly involves the item covered by the submittal until a "Reviewed" or "Reviewed and Noted" stamp is provided by GE's Representative.

GE's Representative will keep a Technical Submittal Register (see Attachment 5) and will update the Register as necessary to reflect receipt of new submittals and/or change in submittal(s) status.

The following provides a list of the required submittals subject to the provisions of this section:

- Proposed substitutions for materials or modifications to procedures specified in the Contract Documents in accordance with Section 3.3 of the Conditions of Work;
- Operations Plan in accordance with Section 3.4 of the Conditions of Work;
- Health and Safety Plan in accordance with Section 3.5 of the Conditions of Work;
- Contingency Plan in accordance with Section 3.6 of the Conditions of Work;
- Work Schedule in accordance with Section 3.7 of the Conditions of Work;
- The name, location, and quantity of each source and type of soil fill material proposed by the Contractor, including provision of a sample from each source and soil fill type, in accordance with Section 3.28 of the Conditions of Work;
- The name of subcontractor(s) to be utilized;
- Record Drawings in accordance with Section 3.32 of the Conditions of Work;
- All sample and analytical results, including all laboratory deliverables (e.g., wipe samples); and
- All other plans, submittals, documents, etc., required in Section 4.0 – Materials and Performance Specifications.

3.3 EQUIVALENT PROCEDURES/PRODUCTS

Unless directed otherwise, the Contractor may propose the use of substitute products and materials other than as specified in the Contract. The Contractor may also submit substitute procedures for performing operations other than as described in the Contract. All proposed substitute materials and procedures must be effectively equivalent to the materials and procedures specified in this Contract. In submitting "equivalent" products or procedures, the Contractor recognizes that it is responsible for all costs associated with furnishing, installing, or performing the "equivalent" product or procedure. This will include all costs for GE's Representative to review, modify, or redesign the scope of work to accommodate the "equivalent" product or procedure.

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The submittal or use of an "equivalent" product or procedure will in no way impact the overall implementation schedule. Potential time delays associated with GE's Representative to review the proposed substitute should be considered by the Contractor in submitting an "equivalent" product or procedure.

The Contractor may prepare its lump sum cost estimate using "equivalent" products or procedures in lieu of those specified within this Contract. However, the Contractor recognizes that this will be done at risk, as the "equivalent" product or procedure may be deemed by GE as unacceptable. No additional costs will be incurred by GE for the replacement of "equivalent" products or procedures with those originally specified.

GE will be the sole judge of acceptability, and no substitute will be ordered, utilized, or installed without GE's prior written acceptance. GE may require the Contractor to furnish, at the Contractor's expense, a special performance guarantee or other surety with respect to any substitute.

3.4 OPERATIONS PLAN

Prior to implementing work activities, the Contractor shall submit an Operations Plan to GE for review and approval. This plan shall address, but not be limited to, the following items:

- List of equipment to be used on-site;
- Procedures for the safety, security, and protection of all adjacent properties (i.e., General Dynamics parking lot, and the Pittsfield Generating Company facility);
- Work schedule (Section 3.7 of the Conditions of Work);
- The Contractor's proposed plan for controlling vehicular and pedestrian traffic while performing construction and operational activities (Section 3.14 of the Conditions of Work);
- The Contractor's qualifications package;
- Stormwater (including run-on and run-off), erosion, noise, and dust control measures;
- Equipment cleaning procedures (Section 3.27 of the Conditions of Work and Attachment 4);
- The Contractor's proposed approach for installing the base liner system; and
- The Contractor's proposed approach for installing and compacting materials within the consolidation areas.

The purpose of the Operations Plan will be to summarize the materials, procedures, and controls that the Contractor intends to utilize during construction and consolidation activities at the OPCAs. The Operations Plan should address all appropriate issues described in the Contract and should be of sufficient detail to allow possible submittal to the Agencies.

For the purpose of developing a bid, the Contractor should assume that the following parameters/activities will be required for preparation of an Operations Plan:

- Attendance at a pre-construction meeting in Pittsfield, Massachusetts to discuss technical implementation issues associated with the work activities. The Contractor's proposed on-site manager, the Contractor's overall project manager, and the site foreman should attend the meeting;

- Within three business days of the meeting, the Contractor must develop a draft Operations Plan for submittal to GE. Preparation of a final version of the Operations Plan within the following two business days should be assumed by the Contractor, as well as one or more conference calls to discuss the plan.

3.5 HEALTH AND SAFETY PLAN

The Contractor shall prepare, submit, and implement a site-specific Health and Safety Plan (HASP) that, at a minimum, meets the requirements of 29 CFR 1910, 29 CFR 1926 (which includes 29 CFR 1926.65), 40 CFR 260-267, and the minimum requirements of GE's site HASP. The Contractor's HASP shall cover all personnel who will be employed by the Contractor to perform remedial work at the site, including direct employees as well as subcontractors. If the Contractor does not wish to include subcontractors under its HASP, then each subcontractor will be responsible for developing and implementing a HASP that meets the requirements outlined in this RFP. The Contractor will be responsible for ensuring that all of its subcontractors have adequate HASPs prior to any on-site work by the subcontractor, and are adhering to the HASPs during the work activities. If a subcontractor agrees to be included under the Contractor's HASP, then a statement to this effect shall be submitted to GE.

The materials subject to consolidation as part of this Contract may contain constituents including, but not limited to, PCBs and certain other constituents listed in Appendix IX of 40 CFR 264. The results of prior sampling and analyses on the materials subject to this Contract will be available for review by the successful Contractor. It is the Contractor's responsibility to understand and incorporate the information obtained from these prior sampling activities in the development of a HASP.

For work required by the Contract involving the potential for personnel contact or exposure to PCBs and other Appendix IX constituents present in the site soils and consolidation materials, the Contractor must comply with 29 CFR 1910, 29 CFR 1926, 40 CFR 260-267, and related regulations that call for developing and implementing a safety and health program for employees involved in hazardous waste operations. The Contractor will be required to comply with all requirements under these regulations for this project.

Prior to commencing field activities, the Contractor must certify that personnel employed at the site who are directly involved with removal measures, including employees and subcontractors, have completed a 40-hour hazardous waste site health and safety training course (and corresponding annual refresher training) in accordance with 29 CFR 1910.120 and 29 CFR 1926.65. The Contractor must also certify that any individuals who later became employed by the Contractor also receive such training prior to performing work at the site.

The Contractor must certify that all personnel who will be employed by the Contractor to perform work at the site, including direct employees as well as subcontractors, have received the initial and annual (if applicable) medical examinations and are enrolled in an ongoing medical surveillance program as required by 29 CFR 1910 and 29 CFR 1926.

The Contractor must also comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596), and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54).

The Contractor will be responsible for the safety of its employees, subcontractors, suppliers, and other parties at the work area as a result of the Contractor's direction.

The Contractor must prepare, submit, and implement a HASP in accordance with 40 CFR 1910.120, 29 CFR 1926.65, and the requirements of GE's HASP. The plan must address, but not be limited to, the following components:

- Identification of Key Personnel — Identify, by name and by title the on-site and off-site health and safety personnel responsible for the implementation of health and safety procedures. All on-site personnel involved in the measures must have OSHA 40-hour Hazardous Waste Training (29 CFR 1910.120 and 1926.65) and the corresponding 8-hour refresher course update.
- Training — Describe and provide certification of all supervisory and on-site personnel having received appropriate health and safety training. Training requirements shall also include attending an initial site orientation prior to engaging in any on-site activities. Sign-off sheets acknowledging attendance shall be provided.
- Medical Surveillance — Certify that all supervisory and on-site personnel have received appropriate medical examinations, and are able to conduct the tasks required for this project including, but not limited to, working with chemicals, using respiratory protection, using personal protective equipment and conducting hazardous waste operations in accordance with 29 CFR 1910.120 and 1926.65.
- Task-specific Hazard/Risk Analysis — Identify and provide a means of mitigating all foreseeable biological, chemical, and physical hazards associated with the work, including, but not limited to, hazards associated with exposure to constituents of concern, heavy equipment operation, site conditions, weather, biological hazards, materials handling, and work around excavated areas.
- Work Zones — Provide a site plan that depicts the designation of zones including (1) Exclusion Zones (2) Decontamination Zones, and (3) Support Zones. The level of personal protection for each zone must also be included.
- Personal Safety Equipment and Protective Clothing — Identify personal safety equipment and protective clothing to be used and available on site. This shall include identifying expected levels of protection (USEPA Protection Levels A, B, C, and D) for each task, and the action levels for personal protective equipment upgrades. A respiratory protection program that meets the requirements of 29 CFR 1910.134, and that establishes specific requirements for any respirator use shall be included.
- Personal Air Monitoring — Identify protocols and criteria associated with personal air monitoring of on-site personnel.
- Equipment Decontamination — Describe methods and procedures to be used for personnel, vehicle, and equipment decontamination.
- Material Safety Data Sheets — Provide material safety data sheets (MSDSs) for all materials to be brought on site, as well as constituents, which are expected to be encountered during the construction activities.
- Construction Safety Procedures (OSHA 1926.1 - 1926.652, Subpart A-P) to address excavation and trenching safety procedures, as well as daily site safety inspection checklist to evaluate these items.
- Standard Operating Procedures and Safety Programs as required by applicable sections of 29 CFR 1910 and 1926.

The HASP, and all subcontractor HASPs, shall be submitted to GE for review at least seven days prior to mobilization to the site. Determination of the appropriate level of worker safety equipment, procedures, or modification to equipment and procedures based on site conditions must be made by the Contractor as a result of site visit(s), review of available information, and anticipated site activities.

Should the Contractor identify any unforeseen or site-specific safety-related factor, hazard, or should a condition become evident while performing work at the site, it will be the Contractor's responsibility to bring

such to the attention of GE both verbally and in writing as quickly as possible for resolution. In the interim, the Contractor should take prudent action to establish and maintain safe working conditions and to safeguard employees, the public, and the environment.

Should the Contractor seek relief from, or substitution for, any portion or provision of the HASP, such relief or substitution must be requested of GE in writing, and if approved, be authorized in writing.

Any disregard for the provisions of these health and safety requirements will be deemed just and sufficient cause for termination of the Contract without compromise.

3.6 CONTINGENCY PLAN

The Contractor must prepare, submit, and implement a Contingency Plan, which includes, at a minimum, the following items:

- Spill prevention control and countermeasures plan for all materials brought on site;
- Emergency vehicular access/egress;
- Procedures for evacuating personnel from the work site;
- List of all contact personnel with phone numbers to include: GE; the Contractor; the City of Pittsfield; fire officials; ambulance service; local, county, and state police; and local hospitals, including routes to local hospitals and procedures for notifying each; and
- Identification of responsible personnel who will be in a position at all times to receive incoming phone calls and to dispatch Contractor personnel and equipment in the event of an emergency situation. The telephone number(s) must be supplied to GE not less than five days prior to commencing the work.

3.7 WORK SCHEDULE

As part of the Operations Plan (Section 3.4 of the Conditions of Work), the Contractor must submit a proposed draft Work Schedule to GE for review and approval. The draft Work Schedule should be a horizontal bar graph including all elements of the construction activities, and should be neatly prepared and labeled indicating all anticipated start and completion dates. Additional requirements are provided below:

- Provide separate lines for each section of work, identifying the first work day of each week.
- At a minimum, the following work items should be included:
 - mobilization;
 - site preparation;
 - Building 71 Expansion subgrade preparation;
 - Building 71 Expansion base liner installation;
 - Building 71 Expansion leachate collection system installation;
 - Hill 78 OPCA consolidation activities;
 - Building 71 OPCA consolidation activities;
 - restoration activities;
 - OPCAs operations and maintenance; and
 - demobilization.

- Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities including work by subcontractors. Indicate the early and late start, early and late finish, float dates, and duration.
- Revise and resubmit a construction progress schedule weekly.

Failure to comply with these requirements may result in work stoppage, at the Contractor's expense, until such time that the requirements of this condition are met.

3.8 PROJECT MEETINGS

A pre-construction meeting will be held following the award of Contract and prior to Contractor mobilization to the site. This meeting will be scheduled by GE after the award of Contract. The purpose of the pre-construction meeting is to review Contract requirements; review/modify the Contractor's Work Schedule (Section 3.7); discuss the development of the Contractor's Operations Plan (Section 3.4); introduce various project team members representing the Contractor, GE, and GE's Representative; and resolve any questions raised by said parties.

In preparing a cost proposal, the Contractor should assume participation in continuous coordination efforts with all on-site parties. "Tailgate" meetings will be held at the work site. These meetings will be attended by on-site representatives of the Contractor and GE to discuss day-to-day operations, schedule, health and safety items, outstanding issues, and the general status of the project. Approximate weekly meetings will be held on-site among representatives of the Contractor, GE, and GE's Representative. These meetings will be held to discuss issues including, but not limited to, project status, schedule, scope of work, and overall project implementation issues.

3.9 PROVISIONS FOR EXTRA WORK/CHANGE ORDERS

While performing this Contract, modifications may be identified that impact the amount of manpower, equipment, materials, or other subcontract services required. In this event, GE will prepare a Change Order. The Change Order will inform the Contractor of Contract modifications and request a cost adjustment in reference to the Contract cost proposal. If the cost adjustment is acceptable to and approved by GE, the Contractor shall proceed with implementing the Change Order. If the cost adjustment is not acceptable to GE, then the work will be performed under force account.

Force account work shall be measured and paid based on expended labor, equipment, and materials, plus an allowance for overhead and profit. At the end of each workday, the Contractor and GE's Representative shall agree on total labor (Contractor and Subcontractor) and equipment hours utilized for the force account work, as well as the quantity of any materials used. Agreement shall be indicated by signature of the Contractor and GE's Representative on each day force account work is being performed.

No payment will be made for work performed on a force account basis until the Contractor has provided GE with statements of costs of such force account work detailed as follows:

- Copy of daily forms from Contractor, summarizing total labor and equipment hours utilized for the force account work, as well as the quantity of any materials used, signed by both the Contractor and GE's Representative.
- A summary of all labor, equipment, and material costs to perform the force account work. This includes:
 - Name, labor classification, date, daily hours, total hours, hourly rate, and extension for each laborer and foreman (does not include superintendents or other labor classifications above a foreman). The hourly rates will be agreed upon by GE (based on the rates submitted by the Contractor, as discussed

in Section 1.11 of this RFP) and will include all supplemental benefits, payroll taxes, insurance premiums, overtime, and other reasonable charges that are paid by the Contractor. The hourly rates should not include any profit or overhead markups (this will be discussed below).

- Equipment name, date, daily hours, total hours, rate (hourly, weekly, or monthly), and extension for each unit of self-owned construction equipment (does not include small hand tools). Based on the duration that the construction equipment was used, either the hourly, weekly, or monthly equipment rate will be used (based on the rates submitted by the Contractor, as discussed in Section 1.11 of this RFP) and will include costs for fuel and maintenance. The hourly, weekly and monthly equipment rates should not include any profit or overhead markups (this will be discussed below). For rented equipment, such equipment will be paid based on the rental cost incurred by the Contractor and a copy of the invoice should be provided to GE.
- Quantities of materials, prices, and extensions. Invoices should be included for all materials used, as well as any transportation charges that may be associated with delivering the materials to the work site.
- Total cost of subcontractors used to perform force account activities. Also, should include a copy of the invoice submitted to the Contractor from the subcontractor.
- Overhead and profit for all force account work shall be computed at 10 percent of the total direct labor cost (not including the premium portion of overtime), total cost of construction equipment, total cost of materials, and total cost of subcontractors.

Overhead shall be defined to include the following items:

- premiums on bonds and any corporate insurance policies;
- all salary and expenses of executive officers, supervising officers, or supervising employees;
- all charges for minor equipment, such as small tools and other miscellaneous supplies and services; and
- all office-based charges related to copies, phone charges, and clerical activities.

3.10 OFFICE TRAILER AND SUPPORT SERVICES

An existing trailer equipped with heat, and electric and telephone service, is located adjacent to the work sites and can be used by the Contractor throughout the construction activities. The Contractor is required, however, to provide portable sanitary facilities near the construction site or at the office trailer for the duration of the project.

In addition, the Contractor shall provide a cellular phone at the work site for the duration of site activities. The cellular phone shall be accessible to key site personnel so that they can contact others or be contacted as required.

3.11 WORK HOURS

GE anticipates that on-site work activities can be conducted during daylight hours (as restricted by any local ordinances), five days per week (Monday through Friday), except in cases of emergency, or unless prior approval has been obtained from GE.

3.12 WORKING LIMITS

The Contractor must restrict all work activities including, but not limited to, storage of materials and equipment to be incorporated in the project, as well as parking of vehicles, heavy equipment, project trailers, etc., to those areas approved by GE (also refer to Section 3.20 of the Conditions of Work).

3.13 EXISTING CONDITIONS

It is the Contractor's responsibility to understand and verify the exact nature, character, quality, and quantity of all conditions to be encountered. Locations, depths, lengths, etc. of existing structures (e.g., ditches, liner systems, utilities, etc.) shown on the Technical Drawings are approximate only, and must be field verified. Any reliance upon the RFP and information made available by GE will be at the Contractor's risk. The Contractor agrees that it will neither have nor assert against GE any claim for damages for extra work or otherwise for relief from any obligation of this Contract based upon the accuracy of the drawings or information furnished. No changes in the contract price or schedule will be allowed for instances where the actual quantities differ from the RFP or the estimates provided by GE. The Contractor may be entitled to an adjustment in the Contract Price only under the circumstances and to the extent provided by the Contract.

3.14 WORK WITHIN PUBLIC ROADWAYS

The use and protection of all public roadways involved in this Contract must be in accordance with all applicable federal, state, county, and local requirements. All transportation of equipment and materials along public roadways must be preceded by the application and issuance of all necessary road and bridge crossing permits from the appropriate public agencies. The Contractor will be responsible for all permits and associated fees. Repair and/or replacement of any damages to existing roadways or bridges will be the Contractor's responsibility.

In accordance with City of Pittsfield requirements, the Contractor will provide and pay for all required and appropriate traffic warnings and controls for all points of equipment access to the site. Such warnings and controls will include, but are not limited to, warning signs and the use of a flagperson or police officer during all instances when heavy equipment enters or exits the site. The use of such controls must be maintained for the duration of on-site activities.

At a minimum, the Contractor shall assume that a flagperson or police officer will be needed at the work site when oversized vehicles are entering or exiting the work site. The Contractor's proposed method for controlling vehicular/pedestrian traffic during construction activities at each work site should be included in the Operations Plan (Section 3.4 of the Conditions of Work). Costs for a flagperson or police officer must be included in the Contractor's bid.

3.15 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

During this Contract, it will be necessary to work adjacent to existing utilities, structures, and equipment. The Contractor must not interfere with or cause damage to any existing structures or utilities. The Contractor must notify utility companies (and/or any private organization who is authorized by the utility companies to delineate the presence of all subsurface services [e.g., Massachusetts DIGSAFE]) at least seventy-two hours before on-site activities are started. The Contractor will provide the necessary utility contact information for GE to verify that such notification has occurred prior to initiating on-site activities. The utilities must be protected in a manner prescribed by the utility company. Any existing structure or utility that is damaged during the construction activities must be immediately reported to the respective utility company (if applicable) and GE. Appropriate repairs shall be made at the expense (time, labor, materials, etc.) of the Contractor.

3.16 PROTECTION OF THE ENVIRONMENT

While performing construction activities, the Contractor must take all necessary precautions to protect the environment. In doing so, the Contractor must protect all water courses, surface waters, groundwater, soils, and air from degradation or damage in accordance with all federal, state, and local laws and regulations.

To prevent accelerated erosion of areas subject to construction activities and to prevent excess sedimentation in site drainage pathways, the Contractor must utilize appropriate soil erosion and control measures. This will include the placement and maintenance of staked hay bales, silt fences, check dams, and/or other surface-water diversion methods at the locations identified on the Technical Drawings, around temporary soil staging areas, and in additional areas as noted by GE or GE's Representative during construction activities. All erosion control measures must be inspected daily and after any rainfall to assure that maximum control is being provided. Following inspection, and as necessary, the erosion control measures should be modified, cleaned, reinforced, replaced, and/or maintained.

The Contractor must take adequate measures for keeping noise levels produced by construction equipment, to safe and tolerable limits as set forth by OSHA, the USEPA, Massachusetts codes or ordinances, and/or any local requirements. All construction equipment presenting a potential noise nuisance must be provided with noise muffling devices.

The Contractor will make available to GE (on a timely basis) the results of any air monitoring conducted by the Contractor as any form of worker or work area monitoring. The Contractor's proposed air monitoring approach must be identified in its HASP.

3.17 TEMPORARY FENCING

The Contractor shall install and maintain temporary fencing or other temporary barriers to minimize unauthorized or unknowing access to the work site. At a minimum, the following areas will be subject to this requirement:

- Areas where any construction or construction-related activities occur;
- Areas designated as Contractor-identified health and safety zones (e.g., Exclusion Zones, Support Zones, etc.);
- Areas utilized for personal or equipment cleaning activities;
- Any areas where the activities of the Contract may disrupt the normal vehicular or pedestrian traffic at the site; and
- Existing fence line areas that are temporarily removed for construction activities.

Wherever possible, the temporary fencing or barrier should be construction-type fencing, constructed of high density polyethylene (HDPE), or equivalent, 4 feet in height (minimum), and orange in color. The fencing should be supported by vertical posts installed at a depth into the ground and at an interval that will withstand normal wind loads. Where the surface does not allow the use of support posts driven into the ground, alternate means should be utilized by the Contractor. Wood barriers are an acceptable alternative for paved areas or areas where the fencing/barrier is needed on a short-term basis only.

3.18 DISPOSAL OF CLEARED MATERIALS

All materials that are cleared to facilitate work at a given area must be disposed of according to the following criteria:

- All materials cleared from at or below grade (i.e., tree stumps/roots, wood chips, surface debris, etc.) must be chipped or ground (as applicable), and temporarily stockpiled on-site at a location approved by GE for future disposal within the consolidation area. These materials may, with GE's approval, be used to stabilize any wet material delivered to the site for consolidation, construct temporary access roads within the confines of the consolidation areas, or for any other purpose as long as they are used, and ultimately disposed of, within the consolidation area.
- All vegetative materials cleared from above grade (i.e., trees/brush/branches, etc.) should be chipped and/or shredded and temporarily stockpiled on site at a location approved by GE for future use during consolidation activities (e.g., roadway surfacing materials during wet periods, landscaping materials, etc.).

3.19 TEMPORARY ACCESS ROADS

Temporary access roads may be constructed at the work site, as necessary, to provide further access for equipment and vehicles. The temporary access roads shall consist of, at a minimum, a geotextile overlain by 6 inches of crushed stone. Access road widths, locations, and configurations shall be developed by the Contractor in accordance with its planned construction activities. The Contractor shall remove access roads at the conclusion of construction activities, unless otherwise directed by GE. If removed, the access road materials shall be disposed on site at a location approved by GE.

3.20 EQUIPMENT STORAGE

The areas available to store the Contractor's equipment and materials are located between the two OPCAs, north of the paved access road and south of the stormwater pond, as well as the area located south of the Hill 78 OPCA and west of Pittsfield Generating Company (refer to Technical Drawing No. 3). If the Contractor requires additional on-site storage space, it may notify GE, who will attempt to make arrangements for additional storage areas in the vicinity of the work. All areas that are used to store equipment and materials shall be restored to original conditions upon completion of work activities at no additional cost to GE.

Space may be made available for storage of equipment and materials at other locations at the GE facility. The Contractor may use this or other off-site storage areas provided that such use does not impede the progress of the work and is at no additional cost to GE.

3.21 AIR MONITORING

Perimeter air monitoring will be conducted by GE's Air Monitoring Contractor during project components that include handling site soils and imported consolidation materials. Such monitoring is for the purpose of gauging the presence of airborne particulates (if any) resulting from work activities, and shall not be relied upon by the Contractor as any form of worker or work area monitoring. Monitoring results will serve as one mechanism to initiate dust control activities (Section 3.22 of the Conditions of Work).

Prior to initiating work on any given day, or following a work shutdown, the Contractor shall verify that air monitoring is underway. If, for any reason, air monitoring is not being conducted, the Contractor is prohibited from performing any site activities that could potentially create airborne dust. Any violations of this Condition of Work and any regulatory fines imposed as a result of this violation, are the responsibility of the Contractor.

GE's Representative will inform the Contractor of any exceedances of the 120 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) airborne particulate concentrations action level, and the Contractor will be responsible for implementing dust control measures immediately to mitigate this condition.

3.22 DUST SUPPRESSION

The Contractor shall be responsible for controlling any/all dust generated as a result of excavation, backfilling, unloading of imported materials, placement of consolidation materials, or any other site activities. Dust will be controlled based on visual observations and/or the results of any airborne particulate monitoring conducted by GE's Air Monitoring Contractor. The presence of any visible dust during construction activities is not acceptable and will require the temporary suspension of work activities and implementation of appropriate dust control measures. Appropriate dust control measures include the following:

- Spraying water on access roads;
- Spraying water on excavation faces, dozer blades during grading, and soil when unloading transport vehicles;
- Spraying water on backfill stockpiles and on backfill materials that have been placed in fill areas;
- Hauling soil materials in properly tarped vehicles;
- Restricting vehicle speeds; and
- Covering soil piles with polyethylene sheeting after work activities cease for the day.

The Contractor shall make every attempt to use existing water supplies (e.g., fire hydrants, piping networks, etc.) at no cost to GE. However, the Contractor should also make a source of water (water tank truck, storage tank, etc.) available at the work site. The Contractor will be responsible for maintaining, in the immediate vicinity of the work, a supply of water and means of dispersion (e.g., a water tank and sprayer, tanker truck with hose, etc.) such that water may be applied for dust control immediately as required. If the dust control measures being utilized by the Contractor do not eliminate or substantially lower dust levels as determined by GE based on visual observations and/or the results of airborne particulate monitoring, work activities must be suspended until the Contractor develops the appropriate corrective measure(s) to remedy the situation.

3.23 ESTIMATED QUANTITIES

The Contractor's bid price shall be based on the required work activities outlined in this RFP, specified in the Materials and Performance Specifications, shown on the Technical Drawings, and/or deemed necessary to complete the work activities. To allow for a common basis for developing cost proposals, the Contractor shall use the volume estimates provided in this RFP for the material consolidation periods. Deviations in this estimate compared to the actual in-place survey volumes will be reimbursed on an add/deduct basis.

3.24 MEASUREMENT AND PAYMENT

The method of payment for the various components of the construction will be on a lump sum or unit price basis with provisions for add/deduct as appropriate. Deviations from lump sum amounts (solely based on the direction of GE) will result in appropriate add/deduct modifications to the original lump sum cost proposal. Also, as a means of monitoring the progress of the work, the Contractor must submit to GE, weekly, written verification of construction activities completed and the information supporting this verification (e.g., notes, dimensions, calculations, and sketches). Although estimates are to be provided

weekly, the final quantities associated with add/deduct amounts will be based on the results of pre- and post-construction surveys (Section 3.26 of the Conditions of Work). The Contractor must account for all mixing of materials, settlement, compaction, and all other volume-reducing factors when developing its cost proposal.

3.25 SEGREGATION OF MATERIALS

Two categories of materials have been identified for consolidation activities: "TSCA" and "Non-TSCA". When consolidating materials, the Contractor must take all necessary precautions to prevent the mixing of materials from each classification and/or the consolidation of materials into the inappropriate OPCA. The Contractor is responsible for any and all errors as they pertain to the active consolidation activities.

3.26 SURVEY CONTROL

The Contractor will be responsible for performing all survey activities, using a Massachusetts-licensed land surveyor, during construction activities. The vertical survey control to be used during construction of the Building 71 OPCA expansion will be 0.05 feet unless otherwise approved by GE or GE's Representative. The survey activities will include, at a minimum, the following:

- Reviewing the Technical Drawings for the site prior to initiating site activities, and thoroughly evaluating the existing conditions at the work site. The Contractor, at its own expense, may verify existing conditions through additional field survey.
- Staking out the limits of construction/consolidation and maintaining the stakes during construction/consolidation activities.
- Performing detailed horizontal and vertical control surveys during construction activities and following material consolidation. The survey data will be used as the basis for comparing the "pre-consolidation" and "post-consolidation" surfaces, and for determining the payment quantities for "In-Place Cubic Yards" for any additional or reduced quantities of materials (i.e., add/deduct amounts). The Contractor shall also complete the as-built elevation table provided on the Technical Drawings.
- Installing additional stakes prior to completing work activities to establish final elevations and facilitate site restoration activities.
- Performing a detailed survey following site restoration activities of all areas disturbed during construction/consolidation activities to verify that the site is restored in accordance with the provisions of the Contract and to develop final quantities for payment (if applicable).
- Providing detailed as-built drawings depicting all appropriate features (e.g., top of slope, toe of slope, pipe locations and inverts, anchor trench locations, etc.).
- Providing all survey notes (e.g., control points, baseline data, etc.) to GE to allow survey replication by GE.

GE's Representative may periodically audit the Contractor's surveyor, both in the field and office, to review all accumulated data and to evaluate the surveyor's performance. The Contractor should assume that these periodic audits will be performed biweekly.

Based on the contents of this Conditions of Work section, the Contractor should anticipate and schedule site work to accommodate survey activities. No Contractor claims for additional payment due to work interruption caused by survey activities will be considered by GE.

3.27 CONTRACTOR EQUIPMENT AND MATERIALS CLEANING

All reusable equipment and materials utilized by the Contractor in performing this Contract must be cleaned prior to its relocation within the site, prior to handling "clean" materials, and prior to its departure from the site. All cleaning activities will be performed at the site in an area approved by GE.

Non-disposable equipment cleaning shall be deemed complete based on a review by GE's Representative and the analytical results of wipe samples. GE's Representative may collect a minimum of three wipe samples from each piece of Contractor-controlled equipment prior to demobilization from the site. The wipe samples will be submitted to a GE-approved laboratory for PCB analysis on a 24-hour turnaround basis (at the Contractor's expense) to confirm that PCBs are not present at concentrations greater than or equal to 10 micrograms per 100 square centimeters (10 $\mu\text{g}/100\text{ cm}^2$). Equipment that does not meet this objective will be recleaned by the Contractor at no additional expense to GE. As described in Attachment 4 to this RFP, even if select wipe samples obtained from select pieces of equipment exhibit concentrations below, but near 10 $\mu\text{g}/100\text{ cm}^2$, the sample results may not adequately verify that the entire piece of equipment is below 10 $\mu\text{g}/100\text{ cm}^2$ (see Section 7.0 of Attachment 4). As such, GE may require additional cleaning efforts and wipe sampling. As stated above, **the Contractor will pay all analytical costs incurred by GE during the equipment cleaning and sampling activities.**

All portions of transport vehicles that have contacted the consolidation materials (e.g., wheels, undersides, etc.) must also be cleaned using a high-pressure, low-volume water spray in the equipment cleaning area.

Wash water, solids, and other materials generated during equipment cleaning outside of the Building 71 OPCA must not contact native soils and existing facilities, and must be collected by the Contractor and placed into the Building 71 OPCA manhole. Solids, soils, and other materials will be placed into the Building 71 OPCA and covered.

The Contractor, at its option, may transport its equipment and materials to GE's on-site Equipment Decontamination Area (EDA) for cleaning by GE. If the Contractor opts to use the EDA, it shall provide the amount to be credited to GE in Section 2.4.

The Contractor must submit its proposed equipment cleaning procedures as part of the Operations Plan (Section 3.4 of the Conditions of Work).

3.28 SOIL FILL SOURCES

Only soil fill approved by GE may be utilized at the site (e.g., road gravel, topsoil, interim covers, etc.). The Contractor is required to specify the name and location of the proposed fill sources with its bid. At least one week prior to the procurement or use of fill from any source, the Contractor shall provide GE with one sample of the proposed soil fill material. These samples will be subject to the following analyses at the expense of GE:

- PCBs;
- Volatile organic compounds (VOCs);
- Semi-VOCs; and
- Metals.

The results of the analyses will be compared to the appropriate regulatory levels. If such analyses indicate unacceptable chemical characteristics, GE will reject the use of fill materials from the proposed source(s), and the Contractor must identify and submit a sample(s) from another fill source. If a fill source is rejected by GE, analytical testing for one additional fill source will be performed at the expense of GE. If additional

fill sources (more than two sources per fill material) are rejected, additional testing will be at the expense of the Contractor.

Soil sampling results previously submitted to, and approved by GE (within the last calendar year), for the proposed sources can be submitted to GE in lieu of additional testing. However, GE reserves the right to request additional verification testing prior to source approval.

3.29 REMOVAL/DISPOSAL OF ACCUMULATED WATERS

In the event that accumulations of direct precipitation or runoff are present in quantities that inhibit consolidation activities, the Contractor shall be responsible for providing the necessary equipment, materials, and labor to remove and dispose such water. At a minimum, this shall include the provision of pumps and a means of transferring waters accumulated to the leachate collection manhole. The pumps shall be used to remove accumulated water from the consolidation cell whenever the presence of such water inhibits consolidation activities, compromises the integrity of the consolidation cell, may overtop the consolidation cell, or as directed by GE or GE's Representative. Accumulated waters pumped out of the consolidation cells shall be pumped into on-site frac tanks to be provided by the Contractor, or directly to the leachate collection manhole. Double containment for all pipe/hose shall be provided outside the liner system limits (i.e., between the liner limits and the manhole).

All equipment used in handling accumulated waters, including pumps, frac tanks, and tanker trucks, shall be subject to cleaning procedures as described in Section 3.27 prior to their final removal from the site.

3.30 RESIDUAL WASTES

Residual wastes, including used personal protective equipment, gloves, etc., generated by the Contractor and GE's Representatives must be collected by the Contractor and placed into appropriate containers (when necessary) for future disposal by the Contractor in the appropriate OPCA. Liquids collected outside the Building 71 OPCA, with low solids content, must be transported to, and off-loaded into, the Building 71 OPCA manhole. Solids, soils, and other materials must be disposed of in the appropriate consolidation area.

3.31 SITE RESTORATION AND WARRANTY

Site restoration activities will be required for all disturbed areas. Portions of fencing that are relocated as part of the construction/consolidation activities must be restored by the Contractor as required to match the existing fencing. The restoration of any areas resulting from damage by the Contractor due to negligence or improper activities must be repaired by the Contractor at no expense to GE.

The finished products of restoration must be maintained and adequately protected using erosion control measures, as appropriate, such that conditions similar to pre-construction conditions exist during a period of one year following the date of substantial completion of work. Any settlement (including visible cracks and depressions greater than 1 inch) occurring in backfilled excavations during this time period must be repaired by the Contractor at no additional cost to GE.

3.32 RECORD DRAWINGS

While implementing the consolidation activities, the Contractor must keep one set of the Technical Drawings at the site on which the Contractor must clearly document all construction activities. The drawings must accurately show all changes in, or directly associated with, the work under this Contract. Such changes must be neatly and clearly marked on the drawings using colored ink or pencil, and the entire set of drawings must be kept current on a day-to-day basis in concert with the progress of the work. Where applicable, the change marked on a drawing is to carry the notation "per Change Order No. ____," or similar reference that cites the

reason for the change. The day to day construction Record Drawings must be made available to GE for review upon request.

The following items are examples of some of the types of changes, which could occur and are to be recorded on the Record Drawings by the Contractor:

- Change in location of project components, including vertical elevations (e.g., rim or invert elevations);
- Modified construction/consolidation limits and explanation for change;
- Additions to project;
- Elimination of a project component;
- Relocation of existing underground utilities made necessary because of interference with project components;
- Unforeseen modifications made to existing structures made necessary by requirements of the work; and
- Site restoration modifications made at the request of GE.

If no changes were made to certain components of the work, a note should be added to the construction detail or drawing indicating such.

GE retains the right to withhold an additional portion of payments (up to 5% of the total contract price) to the Contractor if Record Drawings are not kept current in accordance with this section.

Upon substantial completion of the Contract, the Contractor must deliver two (2) complete, accurate and legible sets of Record Drawings to GE.

3.33 COORDINATION WITH OTHERS

The effective and timely performance of work activities at the work sites will require coordination between the Contractor (and any of its subcontractors), GE, GE's Representative, the Air Monitoring Contractor, other remediation contractors, and the Agencies. The Contractor shall recognize and accommodate the work of other contractors to facilitate timely implementation of the overall project. Several conditions have been included in this Contract to facilitate coordination efforts. These include Project Meetings (Section 3.8 of the Conditions of Work), Work Schedule (Section 3.7 of the Conditions of Work), and the identification of the sequence of construction activities (in the Operations Plan, Section 3.4 of the Conditions of Work).

3.34 MEDIA RELATIONS

The work of this contract may potentially be subject to coverage by the media and other special interest groups. Under no circumstances shall the Contractor, any subcontractor, or employee thereunder provide interviews or any information regarding the scope, progress, or performance of the work. All requests for interviews or information made by any such individual or group shall be directed to:

3-18
401.36

Mr. John F. Novotny, P.E.
General Electric Company
100 Woodlawn Avenue
Pittsfield, Massachusetts 01201
Telephone: (413) 494-3177

- END OF SECTION -

SECTION 4.0 - MATERIALS & PERFORMANCE SPECIFICATIONS

Section 01160 - Survey Control

Section 02110 - Clearing and Grubbing

Section 02200 - Earthwork

Section 02207 - Restoration of Surfaces

Section 02212 - Topsoil, Seeding and Mulch

Section 02219 - Geosynthetic Drainage Composite

Section 02222 - Soil Fill Materials

Section 02232 - Geotextile Fabric

Section 02233 - Silt Fencing

Section 02234 - Flexible Membrane Liner

Section -02271 - Riprap

Section 02526 – High-Density Polyethylene Pipe

MATERIALS AND PERFORMANCE - SECTION 01160

SURVEY CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Survey control for construction purposes is provided on the Technical Drawings. The Contractor shall safeguard all survey points and bench marks. Should any of these points be destroyed, the replacement cost shall be borne by the Contractor. The Contractor shall assume the entire expense of rectifying work improperly constructed due to failure to maintain and protect such established survey points and bench marks.
- B. The Contractor shall be responsible for the layout of any additional survey controls, grid coordinate locations, lines, grades, and elevations necessary for the proper construction and testing of the work called for by the Technical Drawings and Specifications, at no additional cost to GE. Survey activities shall include, but not be limited to: maintaining appropriate slopes and specified layer thicknesses.
- C. Vertical survey tolerance to be maintained during construction of the Building 71 OPCA expansion is 0.05 feet unless otherwise approved by GE or GE's Representative.
- D. The Contractor shall employ a Massachusetts licensed surveyor to provide the surveying functions necessary for the proper construction and documentation of the work.

- END OF SECTION -

MATERIALS AND PERFORMANCE - SECTION 02110

CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Under this section, the Contractor shall prepare and clear from the work site, by removal or destruction, as may be required, the following:

1. Pieces of rock up to 2 cubic yards in volume and large boulders
2. Trees and Bushes
3. Pavements
4. Brush/wood chips
5. Logs and Stumps
6. Refuse and Rubbish
7. Decayed and Growing Organic Matter

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section MP-02200 - Earthwork
- B. Section MP-02207 - Restoration of Surfaces
- C. Section MP-02212 - Topsoil, Seeding and Mulch
- D. Section MP-02222 - Soil Fill Materials
- E. Section 3.18 - Disposal of Cleared Materials
- F. Section 3.22 - Dust Suppression

PART 2 - PRODUCTS

Not included.

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall furnish all labor, material, and equipment necessary to properly complete all work under this section.

B. Tree Protection

1. Any tree that shall not, in the opinion of GE or GE's Representative, hinder construction or landscaping shall be protected by stakes placed in a circle having a radius of not less than 5 feet as measured from the base of the trunk around the tree. The stakes shall extend at least 4 feet above the existing ground. Each circle shall consist of at least 6 stakes.

MATERIALS AND PERFORMANCE - SECTION 02110

CLEARING AND GRUBBING

C. Debris Removal

1. All brush and trees shall be removed from the area, chipped or shredded, and disposed of at a location selected by GE for future use during consolidation activities, unless otherwise directed by GE.

3.02 ENVIRONMENTAL PROTECTION

A. Prohibited Construction Procedures

1. Prohibited construction procedures include, but are not limited to:
 - a. Dumping of spoil material into any wetlands, any surface waters, or at unspecified locations.
 - b. Indiscriminate, arbitrary or capricious operation of equipment in any stream corridors, any wetlands or any surface waters.
 - c. Pumping of silt-laden water from trenches or other excavations into any surface waters, any stream corridors or any wetlands.
 - d. Damaging vegetation beyond the extent necessary for construction of the consolidation area.
 - e. Disposal of trees, brush, and other debris in any wetlands, any surface waters or at unspecified locations.

B. Erosion and Sedimentation Control

1. Erosion control procedures, inclusive of mulching, shall be on site. Erosion control shall occur as required in accordance with Section 02233 entitled Silt Fencing, Section 3.16 of the Conditions of Work, and the Technical Drawings. Controls shall be established prior to site and access clearing.
2. De-watering operations shall direct water that interferes with construction to an area approved by GE or GE's Representative, so as to allow sediment to settle out before such water enters any surface waters. Care should be taken not to damage or kill vegetation by excessive water or by damaging silt accumulation in the discharge area. Settling basins and silt fencing should be used upon GE or GE's Representative's direction, or as otherwise required to protect vegetation and to achieve environmental objectives.

C. Dust Control

1. Dust shall be controlled by sprinkling and sweeping on paved areas and by sprinkling on unpaved areas.

- END OF SECTION -

MATERIALS AND PERFORMANCE - SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All labor, materials, services, and equipment necessary to complete the earthwork activities as depicted on the Technical Drawings and/or as directed by GE or GE's Representative.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section MP-02110 - Clearing and Grubbing
- B. Section MP-02207 - Restoration of Surfaces
- C. Section MP-02222 - Soil Fill Materials
- D. Section 3.21 - Air Monitoring
- E. Section 3.22 - Dust Suppression

1.03 SUBMITTALS

- A. Contractor's proposed method(s) of compaction and equipment.

1.04 APPLICABLE CODES, STANDARDS AND SPECIFICATIONS

- A. American Society for Testing and Materials (ASTM)

1.05 DEFINITION

- A. Earthwork is defined to include, but is not limited to, clearing, pavement removal, rough grading, excavation for subgrades, trenching, handling and disposal of surplus materials, maintenance of excavations, removal of water, backfilling operations, embankments and fills, and compaction.

PART 2 - PRODUCTS

Specified elsewhere.

PART 3 - EXECUTION

3.01 UNAUTHORIZED EXCAVATION

- A. The Contractor shall not be entitled to any compensation for excavations carried beyond or below the lines and subgrades prescribed in the Technical Drawings. The Contractor shall refill such unauthorized excavations at its own expense and in conformance with the provisions of this Section.
- B. Should the Contractor, through negligence or for reasons of its own, carry its excavation below the designated subgrade, appropriate materials specified in MP Section 02222 - Soil Fill Materials shall be furnished and placed as backfill in sufficient quantities to reestablish

MATERIALS AND PERFORMANCE - SECTION 02200

EARTHWORK

the required subgrade surface. Soil fill materials used for backfilling shall be spread and compacted in conformance with the requirements of later subsections of this section, and to the percentage compaction outlined therein. The cost of any tests required as a result of this refilling operation shall be borne by the Contractor.

- C. All material which slides, falls, or caves into the established limits of excavations due to any cause whatsoever, shall be removed and disposed of at the Contractor's expense, and no extra compensation will be paid to the Contractor for any materials ordered for refilling the void areas left by the slide, fall, or cave-in.

3.02 BACKFILL MATERIALS

- A. Soil fill material shall be used as specified for backfill, and when excavated material cannot be used as backfill. Requirements for off-site soil fill materials are specified in MP Section 02222 - Soil Fill Materials.
- B. If the excavated material on site is approved in advance by GE or GE's Representative for reuse and as being suitable for filling or backfilling purposes, it shall be used.
- C. On-site material is designated as "native fill" or "existing soil" material.
- D. When on-site material is used, the Contractor shall remove all frozen material, boulders (over 6-inch diameter), trash, and debris, from such material prior to placement.
- E. If it so elects, the Contractor may, at its own expense, substitute other types of material specified elsewhere in place of native fill material, provided such substitution is approved in advance by GE or GE's Representative and provided that all replaced material is disposed of as specified in the Contractor's Operations Plan.

3.03 GENERAL BACKFILLING REQUIREMENTS

- A. Backfill shall be started at the lowest section of the area to be backfilled.
- B. Drainage of the areas being backfilled shall be maintained at all times.
- C. Areas to be backfilled shall be inspected prior to backfilling operations. All unsuitable materials and debris shall be removed.
- D. Backfill material shall be inspected prior to placement and all roots, vegetation, organic matter, or other foreign debris shall be removed.
- E. Stones larger than 6 inches in any dimension shall be removed or broken.
- F. Stones shall not be allowed to form clusters with voids.

MATERIALS AND PERFORMANCE - SECTION 02200EARTHWORK

- G. Backfill material shall not be placed when moisture content is too high to allow proper compaction.
- H. When material is too dry for adequate compaction, water shall be added to the extent necessary.
- I. No backfill material shall be placed on frozen ground nor shall the material itself be frozen or contain frozen soil fragments when placed.
- J. No calcium chloride or other chemicals shall be added to prevent freezing.
- K. Material incorporated in the backfilling operation that is not in satisfactory condition shall be subject to rejection and removal at the Contractor's expense.
- L. If the Contractor fails to stockpile and protect on-site excavated material acceptable for backfill, then the Contractor shall provide an equal quantity of acceptable off-site material at no expense to GE.
- M. A minimum soil cushion of 24 inches (measured prior to compaction) shall be maintained between construction equipment and geosynthetics.
- N. With the exception of backfill placed directly over geosynthetics, the maximum lift thickness is 12 inches (measured prior to compaction).

3.04 METHOD OF COMPACTION

A. General

- 1. The Contractor shall adopt compaction methods that shall produce the degree of compaction specified herein, prevent subsequent settlement, and provide adequate support.
- 2. Methods used shall avoid disturbance to underlying fine-grained soils and to subsurface utilities.
- 3. Before filling or backfilling is begun, the Contractor shall submit in its Operations Plan the equipment and method for compaction that it proposes to use.
- 4. Hydraulic compaction by ponding or jetting shall not be permitted.
- 5. Backfill material shall not be left in an uncompacted state at the close of a day's construction.
- 6. Prior to terminating work, the final layer of compacted fill, after compaction, shall be rolled with a smooth-drum roller if necessary to eliminate ridges of soil left by tractors, trucks, or other equipment used for compaction.

MATERIALS AND PERFORMANCE - SECTION 02200

EARTHWORK

7. As backfill progresses, the surface shall be graded such that no ponding of water shall occur on the surface of the fill.
8. Fill shall not be placed on snow, ice, or soil that was permitted to freeze prior to compaction.
9. Unsatisfactory materials shall be removed prior to fill placement.

B. Equipment

1. Generally, equipment for compaction shall be the largest equipment consistent with space limitations of the work areas and the need to protect adjacent facilities.
2. Compaction of fill material in confined areas, such as the base liner anchor trench, shall be accomplished by means of a drum-type, power driven, hand-guided vibratory compactor, or by hand-guided vibratory plate tampers.
3. If the proposed method does not give the degree of compaction required, an alternate method shall be adopted until the required compaction is achieved.
4. The moisture content of backfill or fill material shall be adjusted, if necessary, to achieve the required degree of compaction.

C. Minimum Compaction Requirements

1. Unless specified otherwise on the Technical Drawings or in these specifications, the degree of compaction specified for the various items listed in Table 1 shall be the minimum allowable.
2. Unless the Contractor can successfully demonstrate that its methods shall produce the required degree of compaction, materials to be compacted shall be placed in layers not exceeding the uncompacted thicknesses listed in Table 1.
3. In-place density tests shall be required at a minimum of one test per each lift of backfill placed or at a frequency of 1 passing test per 2,500 square feet of subgrade, 100 cy of soil fill, or 100 linear feet of trench.
4. GE or GE's Representative may order additional in-place density tests to ascertain conformance with the compaction requirements shown on Table 1.
5. The Contractor shall dig test holes at no additional cost to GE when requested for the purpose of taking an in-place density test below the current fill level.
6. The Contractor shall provide free access to trenches and fill areas to make such tests. Payment for these tests shall be made by the Contractor.

MATERIALS AND PERFORMANCE - SECTION 02200EARTHWORK

7. The Contractor shall anticipate time needed due to testing procedures and shall not have claims for extra compensation occasioned by such time.
8. Minimum field compaction requirements in Table 1 are expressed as a percentage of the maximum dry density of the material compacted using the Modified Proctor Compaction Test (ASTM D1557).

TABLE 1 MINIMUM COMPACTION REQUIREMENTS		
Type of Backfill	Maximum Uncompacted Fill Layer Thickness (Inches)	Minimum Compaction (Percent)
1. Subbase (existing or native soil)	8	90
2. Subgrade – Native Soil	Not applicable	Proof-rolling
3. Embankments and Fills	12	90
4. Anchor Trench	12	90

9. Compaction curves for the full range of soil materials, including soil fill and existing soil, shall be developed by the Contractor.
10. Proof-rolling shall be performed prior to placing material over any existing (or native) soils.
11. When proof-rolling existing (or native) soils, the layer shall be acceptable when deformations caused by site equipment (e.g., roller, dump truck) are no deeper than one-inch. All soft or wet materials that continue to deform more than one-inch shall be removed and replaced with suitable material.

MATERIALS AND PERFORMANCE - SECTION 02200

EARTHWORK

3.05 BACKFILL FOR ANCHOR TRENCHES

A. General

1. Anchor trench backfill shall be placed in 12-inch-thick loose lifts and thoroughly compacted by approved mechanical methods to ensure firm bedding. Refer to Table 1 for density requirements.

3.06 BACKFILLING EMBANKMENTS AND EXCAVATIONS

A. General

1. Embankment areas shall be cleared and grubbed prior to initiating fill operations.
2. Embankments and excavations shall be formed or backfilled with satisfactory materials placed in successive layers, approximately horizontal, of not more than 12-inches in loose depth for the full width of the embankment or excavation.
3. All materials placed in constructing the embankment shall be free of organic matter, leaves, grass, roots, and other objectionable material.
4. At all times the Contractor shall slope the embankment to provide surface drainage.
5. The materials placed in the layers shall be of the proper moisture content to obtain the prescribed compaction.
6. Wetting or drying the material to secure a uniform moisture content throughout the layer may be required.

B. Compaction

1. Rolling operations shall be continued until the backfill is compacted to the density as specified in Subsection 3.04 (above) entitled Method of Compaction.
2. Any areas inaccessible to rollers shall be compacted by mechanical tampers.
3. In the construction of embankments, starting layers shall be placed in the deepest portion of the fill, and as placement progresses, layers shall be constructed approximately horizontal, maintaining drainage and keying layers into adjoining slopes.
4. The compaction equipment shall be of such design, weight, and quantity as to obtain the required density.

MATERIALS AND PERFORMANCE - SECTION 02200

EARTHWORK

3.07 GRADING

- A. After completing all fill and backfill operations, the Contractor shall grade the site to the lines, grades, and elevations shown on the Technical Drawings, taking into account any subsequent site restoration requirements.

3.08 EXISTING FACILITIES

A. General

1. Existing subsurface facilities may be encountered during construction of the work, or located in close proximity to the work.
2. These facilities may include, but are not necessarily limited to, sewers, drains, water mains, conduits and their appurtenances. These facilities may not be shown on the Technical Drawings. However, the sizes, locations, and heights or depths (if indicated) are only approximate, and the Contractor shall conduct its operations with caution and satisfy itself as to the accuracy of the information given. The Contractor shall not claim nor shall it be entitled to receive compensation for damages sustained by reason of the inaccuracy of the information given or by reason of its failure to properly maintain and support such structures.
3. There may be other subsurface facilities, the existence and/or location of which are not known, such as individual water and gas services, electrical conduits, storm drains, etc. The Contractor shall consult with GE or GE's Representatives of such facilities and, if possible, shall determine, prior to construction, the location and depth of any such facilities that may exist in the area to be excavated.
4. If underground facilities are known to exist in an area but their location is uncertain, the Contractor shall exercise reasonable care in its excavation technique to avoid damage to them.
5. The Contractor shall notify Massachusetts DIGSAFE 72 hours prior to any site work.

B. Notification and Protection Procedures

1. Except where superseded by state or local regulations, or in the absence of any applicable regulations, the Contractor shall, as a minimum, include the following procedures in its operations:
 - a. Prior to Excavating
 1. Determine correct field location of all nearby underground facilities to arrange for Representatives of the utilities to locate them.

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EARTHWORK

2. Notify owners of nearby underground facilities when excavating is to take place, allowing them reasonable time to institute precautionary procedures or preventive measures that they deem necessary to protect their facilities.
 3. In cooperation with owners of nearby facilities, provide temporary support and protection of those underground facilities that may be especially vulnerable to damage by virtue of their physical condition or location, or those that could create hazardous conditions if damaged.
- b. Immediately notify any utility owner of any damage to its underground facilities resulting from the Contractor's operations, and arrange for repairs to be made as soon as possible.
 - c. In case of an electrical short, or escape of gas or hazardous fluids (resulting from damage to an underground facility), immediately notify GE and all persons who might be endangered and assist in evacuation of people from the area.

3.09 OTHER REQUIREMENTS

A. Unfinished work

1. When, for any reason, the work is to be left unfinished, all excavations shall be filled and all roadways and watercourses left unobstructed with their surfaces in a safe and satisfactory condition. The surface of all roadways shall have temporary pavement.

B. Hauling Material on Street

1. When hauling material over the streets or pavement, the Contractor shall provide suitable tight vehicles so as to prevent deposits on the streets or pavements. In all cases where any materials are dropped from the vehicles, the Contractor shall clean up the same as often as required to keep the crosswalks, streets, and pavements clean and free from dirt, mud, stone, and other hauled material.
2. When hauling materials that contain PCBs or other hazardous constituents, the Contractor shall abide by all applicable federal, state, and local codes, including, but not limited to, manifesting and placarding (if necessary).

MATERIALS AND PERFORMANCE - SECTION 02200

EARTHWORK

C. Dust Control

1. It shall be the sole responsibility of the Contractor to control the dust created by any and all of its operations to such a degree that it will not endanger the safety and welfare of the general public.

- END OF SECTION -

MATERIALS AND PERFORMANCE - SECTION 02207

RESTORATION OF SURFACES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All types of surfaces disturbed, damaged, or destroyed while performing the work under or as a result of the operations of the Contract, shall be restored and maintained, as specified herein or as directed by GE or GE's Representative.
- B. The quality of materials and the performance of work used in the restoration shall produce a surface or feature equal to or better than the condition of each before the work began, as approved by GE or GE's Representative.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section MP-02200 - Earthwork
- B. Section MP-02212 - Topsoil, Seeding and Mulch
- C. Section MP-02222 - Soil Fill Materials

1.03 SUBMITTALS

- A. A schedule of restoration operations shall be submitted by the Contractor for review.

1.04 SCHEDULE OF RESTORATION

- A. After an accepted schedule has been agreed upon, it shall be adhered to unless otherwise revised with the approval of GE or GE's Representative.
- B. The replacement of surfaces at any time, as scheduled or as directed, shall not relieve the Contractor of responsibility to repair damages by settlement or other failures.

PART 2 - PRODUCTS

Specified elsewhere.

PART 3 - EXECUTION

3.01 STONE OR GRAVEL PAVEMENT

- A. All pavement and other areas surfaced with stone or gravel shall be replaced with material to match the existing surface unless otherwise specified.
 - 1. The depth of the asphalt or gravel shall be at least equal to the existing.
 - 2. After compaction, the surface shall conform to the slope and grade of the area being replaced.

MATERIALS AND PERFORMANCE - SECTION 02207

RESTORATION OF SURFACES

3.02 LAWNS AND IMPROVED AREAS

- A. The area to receive topsoil shall be graded to a depth of not less than 6 inches or as specified, below the proposed finish surface.
 - 1. If the depth of existing topsoil prior to construction was greater than 6 inches, topsoil shall be replaced to that depth.
- B. The furnishing and placing of topsoil, seed and mulch shall be as directed by GE or GE's Representative.
- C. When required to obtain germination, the seeded areas shall be watered in such a manner as to prevent washing out of the seed.
- D. Any washout or damage that occurs shall be regraded and reseeded until a good sod is established.
- E. The Contractor shall maintain the newly seeded areas in good condition, including regrading, reseeding, watering, and mowing.

3.03 OTHER TYPES OF RESTORATION

- A. Trees, shrubs, and landscape items inadvertently damaged or destroyed as a result of the construction operations shall be replaced in like species and size.
 - 1. All planting and care thereof shall meet the standards of the American Association of Nurserymen.
- B. Drainage structures, including culverts, manholes, catch basins, and piping, that are destroyed or removed as a result of the construction operations shall be replaced in like size and material, and shall be replaced at the original location and grade unless otherwise shown on the Technical Drawings. When there is minor damage to a culvert and with the consent of GE or GE's Representative, a repair may be undertaken, if satisfactory results can be obtained.
- C. Fences destroyed or removed as a result of the construction operations shall be replaced in like size and material, and shall be replaced at the original location unless otherwise noted.

3.04 MAINTENANCE

- A. The finished products of restoration shall be maintained in an acceptable condition for and during a period of one year following the date of Substantial Completion or other such date as set forth elsewhere in the Contract Documents.

- END OF SECTION -

MATERIALS AND PERFORMANCE - SECTION 02212

TOPSOIL, SEEDING AND MULCH

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work under this section consists of furnishing and placement of topsoil, fertilizer, seed, and mulch, and maintenance of seeded areas until final acceptance.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section MP-02200 - Earthwork
- B. Section MP-02207 - Restoration of Surfaces
- C. Section 3.28 - Soil Fill Sources
- D. Section 3.31 - Site Restoration and Warranty

1.03 SUBMITTALS

- A. Analysis of the seed (to demonstrate compliance with the seed mix identified in Section 2.01 of this specification) and fertilizer (to identify chemical composition), and proposed application rates (to demonstrate compliance with the fertilizer application rate identified in Section 3.01B of this specification).
- B. Should hydroseed be used, the Contractor shall submit all data including material and application rates.
- C. Location of source, and pH and organic content testing of off-site topsoil (if required).
- D. Sample of topsoil to be tested by GE for chemical contaminants as discussed in Section 3.28 - Soil Fill Sources.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Any off-site topsoil shall be unfrozen, friable, natural loam and shall be free of clay lumps, brush needs, litter, stumps, stones, and other extraneous matter. The topsoil shall have an organic content between 5% and 20%, and a pH between 5.5 and 7.5.
- B. Fertilizer shall be a standard quality commercial carrier of available plant food elements. A complete prepared and packaged material containing a minimum of 5% nitrogen, 10% phosphoric acid and 10% potash.
 - 1. Each bag of fertilizer shall bear the manufacturer's guaranteed statement of analysis.
- C. Seed mixtures shall be of commercial stock of the current season's crop and shall be delivered in unopened containers bearing the guaranteed analysis of the mix.

MATERIALS AND PERFORMANCE - SECTION 02212

TOPSOIL, SEEDING AND MULCH

1. All seed shall meet state standards of germination and purity.
- D. Seed mix:

65%	Kentucky Blue Grass
20%	Perennial Rye Grass
15%	Fescue
- E. The seed mix used on the interim cover shall be a quick-germinating rye grass.
- F. Mulch shall be stalks of oats, wheat, rye, or other approved crops free from noxious weeds and coarse materials.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The topsoil shall be applied in a single loose lift of not less than six-inches. No compaction is required or allowed.
 1. Following placement of topsoil and prior to fertilizer application, all stones greater than 1-inch in diameter, sticks, and other deleterious material shall be removed.
- B. The fertilizer shall be applied to the surface uniformly at the rate of 20 pounds per 1,000 square feet.
 1. Following the application of the fertilizer and prior to application of the seed, the topsoil shall be scarified to a depth of at least 2 inches with a disk or other suitable method traveling across the slope if possible.
- C. After the soil surface has been fine graded, the seed mixture shall be uniformly applied upon the prepared surface with a mechanical spreader at a rate specified by the seed manufacturer.
 1. The seed shall be raked lightly into the surface.
 2. Seeding and mulching shall not be done during windy weather.
- D. The mulch shall be hand or machine spread to form a continuous blanket over the seed bed, approximately 2 inches in uniform thickness at loose measurement with a minimum of 90% surface coverage. Excessive amounts or bunching of mulch shall not be permitted.
 1. Unless otherwise specified, mulch shall be left in place and allowed to decompose.
 2. Any mulch that has not disintegrated at time of first mowing shall be removed.

MATERIALS AND PERFORMANCE - SECTION 02212

TOPSOIL, SEEDING AND MULCH

- E. Seeded areas shall be watered as often as required to obtain germination, and to obtain and maintain a satisfactory sod growth. Watering shall be performed in such a manner as to prevent washing out of seed and mulch.
- F. Hydroseeding may be accepted as an alternative method of applying fertilizer, seed, and mulch. The Contractor must submit all data regarding materials and application rates to GE or GE's Representative for review.

3.02 MAINTENANCE

- A. All erosion rills or gullies within the topsoil layer shall be filled with additional approved topsoil and graded smooth, and reseeded and mulched.
- B. The Contractor shall also be responsible for repairs to all erosion of the seeded areas until all new grass is firmly established and reaches a height of not less than 4 inches. All bare or poorly vegetated areas must be reseeded and mulched.

- END OF SECTION -

MATERIALS AND PERFORMANCE - SECTION 02219

GEOSYNTHETIC DRAINAGE COMPOSITE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall provide all labor, materials, tools, and equipment necessary to furnish and install geosynthetic drainage composite where specified in the Technical Drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section MP-02232 - Geotextile Fabric
- B. Section MP-02234 - Flexible Membrane Liner
- C. The Construction Quality Assurance Plan – On-Plant Consolidation Areas (CQAP)

1.03 REFERENCES

- A. American Society of Testing and Materials (ASTM);
 - 1. D1505-98 Specific Gravity
 - 2. D1238-01 Melt Flow Index
 - 3. D1603-01 Carbon Black Content
 - 4. D374-99 Thickness
 - 5. D4716-01 Constant Head Transmissivity
 - 6. D3776-96 Weight
 - 7. D1777-96 Thickness
 - 8. D4632-91 Grab Tensile and Grab Elongation
 - 9. D4833-00 Puncture
 - 10. D4751-99a A.O.S.
 - 11. D4533-98 Trapezoidal Tear
 - 12. D4491-99a Water Flow Rate
 - 13. D413-98 Ply Adhesion

1.04 SUBMITTALS

- A. Operational Submittals
 - 1. Manufacturer's data for the geosynthetic drainage composite including physical properties and roll size.
 - 2. Geosynthetic drainage composite material sample.
 - 3. Manufacturer's quality assurance/quality control program.
 - 4. Certified results of all quality control testing.
 - 5. Contractor's proposed transportation, handling, and storage techniques.
 - 6. Shop drawings, and proposed installation techniques.

MATERIALS AND PERFORMANCE - SECTION 02219GEOSYNTHETIC DRAINAGE COMPOSITEPART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. GSE Lining Technology, Inc.; or
- B. Equal.

2.02 MATERIALS

- A. The geosynthetic drainage composite shall be comprised of a high-density polyethylene (HDPE) drainage net composited with two, 6 oz/yd² non-woven geotextiles. The geotextiles shall be heat bonded to both sides of the drainage net.

- 1. The drainage net to be used in the composite shall be a profiled mesh made by extruding two sets of high density strands together to form a diamond shaped, three-dimensional net to provide planar fluid flow. The drainage net shall be made of HDPE containing carbon black, anti-oxidants, and heat stabilizers that shall be manufactured from resin provided from one resin supplier.

- 2. The geotextile shall be a non-woven, needle punched polymeric material.

- B. The geosynthetic drainage composite shall meet the following specifications:

- 1. Drainage Net

Property	Test Method	Test Value
Specific Gravity (g/cm ³)	ASTM D1505	0.94 minimum
Melt Flow Index (g/10 min)	ASTM D1238 – Condition E	0.3 maximum
Carbon Black Content (%)	ASTM D1603	2.0 minimum
Thickness (mil)	ASTM D374 at Strand Intersection	200 minimum

- 2. Geotextile

Property	Test Method	Test Value
Fabric Weight (oz/yd ²)	ASTM D-3776	5.7
Grab Strength (lbs.)	ASTM D-4632	150
Puncture Resistance (lbs.)	ASTM D-4833	80

MATERIALS AND PERFORMANCE - SECTION 02219

GEOSYNTHETIC DRAINAGE COMPOSITE

Property	Test Method	Test Value
A.O.S. (U.S. Sieve)	ASTM D-4751	70
Water Flow Rate (gal/min/ft ²)	ASTM D-4491	130

3. Compositing Materials

Property	Test Method	Minimum Test Value
Transmissivity (m ² /s)	ASTM D4716*	2.13 x 10 ⁻³
Ply Adhesion	ASTM D413	2.0

* Test methods to be performed with the following modifications:

Substrate Material:	60-Mil HDPE geomembrane
Superstrate Material:	Neoprene or 6-inches of representative soil
Applied Normal Compressive Load:	2,500 lbs/sq.ft.
Seating Time:	2 hours (minimum)
Hydraulic Gradient:	0.1

2.03 DELIVERY, STORAGE AND HANDLING

- A. The geosynthetic drainage composite shall be packaged and shipped by appropriate means so as to prevent damage. Materials shall be delivered only after the required submittals have been received and reviewed by GE or GE's Representative.
- B. The geosynthetic drainage composite shall be furnished in rolls, marked or tagged with the following information:
 1. Manufacturer's Name
 2. Product Identification
 3. Lot/Batch Number
 4. Roll Number
 5. Roll Dimensions
- C. The geosynthetic drainage composite shall be stored in an area approved by GE or GE's Representative that prevents damage to the product or packaging.
- D. The geosynthetic drainage composite shall be kept clean and free from dirt, dust, mud, and any other debris.
- E. Any geosynthetic drainage composite found to be damaged shall be replaced with new material at the Contractor's expense.

MATERIALS AND PERFORMANCE - SECTION 02219

GEOSYNTHETIC DRAINAGE COMPOSITE

2.04 QUALITY ASSURANCE

- A. Field delivered material shall meet the specification values according to the manufacturer's specification sheet. The Contractor shall submit written certification that the delivered material meets the manufacturer's specifications. The Contractor shall submit to GE or GE's Representative certified quality control test results conducted by the manufacturer during the manufacturing of the geosynthetic drainage composite delivered to the project site. The results must identify the sections of field delivered geosynthetic drainage composite they represent. The Contractor shall also provide the lot and roll number for the material delivered to the site.
- B. The manufacturer shall have developed and shall adhere to their own quality assurance program in the manufacture of the geosynthetic drainage composite.
- C. The installer shall verify in writing prior to installation that the geosynthetic drainage composite has not been damaged due to improper transportation, handling, or storage.
- D. Each of the installer's personnel shall have recorded 500,000 sf of successful material installation.
- E. The Contractor shall provide shop drawings for indicating panel layouts and installation sequence.

PART 3 - EXECUTION

3.01 PREPARATION

- A. The areas designated for placement of geosynthetic drainage composite shall be free from any deleterious material.
- B. If the geosynthetic drainage composite is not clean before installation, it shall be washed by the Contractor until accepted by GE or GE's Representative.

3.02 INSTALLATION

- A. Geosynthetic drainage composite shall be installed at locations shown on the Technical Drawings.
- B. Adjacent rolls shall be installed so that the geonet component will have a minimum overlap of 4 inches.
- C. The geonet shall be tied with plastic fasteners every 5 feet along the slope, every 6 inches on butt seams, and every 6 inches in the anchor trench.
- D. The geotextiles shall be continuously sewn using a polymeric thread with chemical and ultraviolet resistance properties equal to or exceeding those of the geotextile.

MATERIALS AND PERFORMANCE - SECTION 02219

GEOSYNTHETIC DRAINAGE COMPOSITE

- E. In the corners of the side slopes, where overlaps between rolls of nets are staggered, an extra layer of geosynthetic drainage composite shall be installed from the top to the bottom of the slope.
- F. The geosynthetic drainage composite shall be unrolled downslope, keeping the net in slight tension to minimize wrinkles and folds.
- G. If a tri-planar material is used, it must be installed in the appropriate flow direction.
- H. Adequate loading shall be placed to prevent uplift by wind.
- I. Holes or tears in the geosynthetic drainage composite shall be repaired in accordance with the manufacturer's recommendations, and/or the CQAP.
- J. A minimum of 2,000 SF of additional geosynthetic drainage composite shall be provided for future use during rain flap removal.

3.03 QUALITY CONTROL

- A. The Contractor shall provide as-built drawings identifying panel layout, locations or imperfections, and repairs and any other appropriate observations.

- END OF SECTION -

MATERIALS AND PERFORMANCE - SECTION 02222

SOIL FILL MATERIALS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. Work under this section shall include, but not necessarily be limited to, supplying all labor and materials, excavating, transporting, dumping, spreading, and compacting Soil Fill Materials in the locations and to the depth shown on the Technical Drawings and/or as directed by GE or GE's Representative.

B. Applicable Standards and Specifications

1. American Society for Testing Materials (ASTM).

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section MP-02212 – Topsoil, Seeding and Mulch.

1.03 SUBMITTALS

- A. Refer to Sections 3.2 and 3.28 of the Conditions of Work.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Select fill shall be the type listed below:

Type 1: Low Permeability Soil

- a. Low permeability soil shall meet the requirements for impervious soil borrow as specified in M1.08.0 (except M1.08.3) of the Massachusetts Highway Department (MHD) Standard Specifications, or approved equal by GE.

Type 2: Leachate Pipe Cover Aggregate

- a. Material placed above the leachate collection piping shall be washed, rounded run-of-bank gravel, with a d_{\max} of 1 1/2-inches and a d_{\min} of 3/4-inches.

- B. General Fill shall be the type listed below:

Type 1: Subbase and Earthen Berms

- a. Material to be used to construct the base liner system subbase and for the earthen berms (i.e., perimeter and interior berms) shall be free of large (greater than 2-

MATERIALS AND PERFORMANCE - SECTION 02222

SOIL FILL MATERIALS

inches) objects, sticks, roots, or any other deleterious materials. Materials must provide a compacted, smooth, uniform surface free from any protruding objects that could damage the overlying FML. Materials must be capable of achieving the minimum compaction requirements presented in Section MP-02200.

Type 2: Interim Cover Material

- a. Interim soil cover material shall consist of material free from excessive amounts of clay and silt, stones larger than 2-inches, large sticks and roots, and other deleterious materials. Material shall have a pH and organic content sufficient to promote vegetative growth.

PART 3 - EXECUTION

3.01 PLACEMENT

- A. The entire surface to be covered with General Fill material shall be stripped of all grass, vegetation, topsoil, rubbish, or other unsuitable materials before backfilling.
- B. In general, soil fill material shall be placed and compacted in horizontal layers no less than 3 inches and not exceeding those thicknesses indicated in Section MP-02200. The subgrade for placement of soil fill material shall be approved by GE or GE's Representative. Soil fill material shall not be placed on ground that shall not support the weight of construction equipment.
- C. Each layer of soil fill material shall be thoroughly tamped or rolled to the required degree of compaction by mechanical tampers, or vibrators. Successive layers shall not be placed until the layer under construction has been thoroughly compacted.
- D. Trucks or other heavy equipment shall not be operated over the fill layer until the minimum thickness of soil fill has been placed and properly compacted by tampers or other approved method.
- E. Where required, the Contractor shall, at its own expense, moisture condition the fill to meet the compaction requirements. If, due to rain or other causes, the material is too wet for satisfactory compaction, it shall be allowed to dry or be removed as required, before compaction.
- F. At the end of a day, the Contractor shall track the slope with a bulldozer perpendicular to the slope to help minimize erosion.

MATERIALS AND PERFORMANCE - SECTION 02222

SOIL FILL MATERIALS

3.02 FIELD TESTING AND QUALITY CONTROL

- A. In-place density testing shall be performed by an independent testing laboratory at the Contractor's expense. Testing shall be performed in accordance with ASTM D2922. In-place density testing shall be as specified in the Earthwork section.

3.03 CRITERIA AND TOLERANCES

- A. Soil fill materials shall be constructed to such heights as to allow for post-construction settlement. Any settlements that occur before final acceptance of the Contract shall be corrected to make the backfill conform with the established lines and grades.

- END OF SECTION -

MATERIALS AND PERFORMANCE - SECTION 02232

GEOTEXTILE FABRIC

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall supply all labor, materials, tools, and equipment required to furnish and install geotextile fabric as specified herein and as shown on the Technical Drawings or as indicated by GE or GE's Representative.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. D5261-92 Unit Weight
 - 2. D4632-91 Grab Tensile and Grab Elongation
 - 3. D3786 Mullen Burst
 - 4. D4833-00 Puncture
 - 5. D4533-91 Trapezoidal Tear
 - 6. D4355-99 Ultraviolet Resistance

1.03 SUBMITTALS

- A. Manufacturer's data for geotextile including, at a minimum, physical properties, packaging, and installation techniques.
- B. Manufacturer's quality assurance/quality control program.
- C. Certified results of all quality control testing.
- D. Contractor's proposed transportation, handling, storage, and installation techniques.
- E. Shop drawings.
- F. Manufacturer's standard warranty provided for the geotextiles.

PART 2 - PRODUCT

2.01 ACCEPTABLE MANUFACTURERS

- A. Synthetics Industries;
- B. Amoco; or
- C. Equal.

MATERIALS AND PERFORMANCE - SECTION 02232GEOTEXTILE FABRIC

2.02 MATERIALS

A. For these specifications and the Technical Drawings, the terms "geotextile" and "geotextile fabric" shall be considered synonymous.

B. Geotextile fabric to be used shall be of the types listed below:

- Type 1: Non-Woven Geotextile, to be used for base liner construction
 Type 2: Polypropylene Woven Geotextile stabilized to resist degradation due to ultraviolet exposure, to be used as protection geotextile above exposed geosynthetic drainage composite

C. The non-woven geotextile shall be of needle-punched construction and consist of long-chain polymeric fibers or filaments composed of polypropylene, shall be free of any chemical treatment that reduces permeability, and shall be inert to chemicals commonly found in soil.

D. The non-woven geotextiles indicated on the Technical Drawings shall have the minimum physical properties listed below:

Type 1: Non-Woven Geotextile

Property	Unit of Measure	Test Method	Minimum Test Value
Grab Tensile	lbs.	ASTM D4632	300
Grab Elongation	%	ASTM D4632	50
Mullen Burst	psi	ASTM D3786	580
Puncture	lbs	ASTM D4833	175
Trapezoidal Tear	lbs	ASTM D4533	115
UV Resistance	% Retained @ 500 hrs.	ASTM D4355	70
Unit Weight	oz./yd. ²	ASTM D5261	12

Type 2: Polypropylene Woven Geotextile

Property	Unit of Measure	Test Method	Minimum Test Value
Grab Tensile	lbs.	ASTM D4632	200
Mullen Burst	psi	ASTM D3786	400

MATERIALS AND PERFORMANCE - SECTION 02232

GEOTEXTILE FABRIC

Property	Unit of Measure	Test Method	Minimum Test Value
Puncture	lbs	ASTM D4833	90
Trapezoidal Tear	lbs	ASTM D4533	75

2.03 DELIVERY, STORAGE AND HANDLING

- A. The geotextile shall be furnished in a protective wrapping that shall be labeled with the following information: manufacturer's name, product identification, lot #, roll #, and dimensions.
- B. The geotextile shall be protected from ultraviolet light, precipitation, mud, soil, excessive dust, puncture, cutting, and/or other damaging conditions prior to and during delivery and on-site storage. The geotextile shall be stored on-site at a location approved by GE or GE's Representative.

2.04 QUALITY ASSURANCE

- A. The field-delivered fabric shall meet the specification values according to the manufacturer's specification sheet. The Contractor shall submit written certification that the delivered material meets the manufacturer's specifications. The Contractor shall provide the quality control test results conducted by the manufacturer during the manufacturing of the geotextile fabric delivered to the project site. The results shall identify the sections/panels of field-delivered fabric they represent. The Contractor shall also provide the lot and roll number for the fabric delivered to the site.
- B. The manufacturer shall have developed and shall adhere to its own quality assurance program in the manufacture of the geotextile.
- C. The installer shall verify, in writing and prior to installation, that the geotextile fabric has not been damaged due to improper transportation, handling, or storage.
- D. The Contractor shall provide shop drawings indicating panel layouts and installation sequence.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Prior to installing the geotextile, placement surfaces shall be leveled and uniformly compacted, as necessary, to provide a stable interface for the geotextile that is as smooth as possible.

MATERIALS AND PERFORMANCE - SECTION 02232

GEOTEXTILE FABRIC

3.02 GEOTEXTILE INSTALLATION

The following procedures and requirements will be followed during the geotextile installation.

A. Placement

1. Placement of the geotextile shall not be conducted during adverse weather conditions. The geotextile shall be kept dry during storage and up to the time of deployment. During windy conditions, all geotextiles shall be secured with sandbags or an equivalent approved anchoring system. Removal of the sandbags or equal shall only occur upon placement of an overlying soil layer. Sandbags will remain on the Type 2 geotextile as necessary to ensure complete coverage of underlying geosynthetic drainage composite during adverse weather conditions.
2. Proper cutting tools shall be used to cut and size the geotextile materials. Extreme care shall be taken while cutting geotextiles.
3. During the placement of geotextiles, all dirt, dust, sand, and mud shall be kept off to prevent clogging. If excessive containment materials are present on the geotextile, it shall be cleaned or replaced as directed by GE or GE's Representative.
4. The Type 1 geotextile shall be covered within the time period recommended by the manufacturer, and in no case later than two weeks after its placement.
5. In all cases, seams on sideslopes shall be parallel to the line of slope. No horizontal seams shall be allowed on side slopes.

B. Seaming and Repairing

1. Geotextiles shall be continuously sewn using a polymeric thread with chemical and ultraviolet resistance properties equal to or exceeding those of the geotextile.
2. Repair of tears or holes in the geotextile shall require the following procedures:
 - a. On slopes: A patch made from the same geotextile shall be double seamed into place; with each seam 1/4-inch to 3/4-inch apart and no closer than 1 inch from any edge. Should any tear exceed 10% of the width of the roll, that roll shall be removed from the slope and replaced.
 - b. Non-slopes: A patch made from the same geotextile shall be spot-seamed in place with a minimum 24-inch overlap in all directions.

MATERIALS AND PERFORMANCE - SECTION 02232

GEOTEXTILE FABRIC

3.03 POST-CONSTRUCTION

A. Upon completing the installation, the Contractor shall submit to GE or GE's Representative:

1. All quality control documentation and the as-built panel drawings.

3.04 WARRANTY

A. The Contractor shall obtain from the manufacturer and submit to GE or GE's Representative, a standard warranty provided for the geotextiles.

- END OF SECTION -

MATERIALS AND PERFORMANCE - SECTION 02233

SILT FENCING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall supply all labor, materials, tools, and equipment required to furnish and install silt fencing as specified herein and as shown on the Technical Drawings, or as directed by GE or GE's Representative.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. D4632 Grab Tensile and Grab Elongation
 - 2. D3786 Mullen Burst
 - 3. D4833 Puncture
 - 4. D4355-99 Ultraviolet Resistance
 - 5. D4751 Apparent Opening Size

1.03 SUBMITTALS

- A. Manufacturer's data for geotextile including, at a minimum, physical properties, and packaging.
- B. Manufacturer's quality assurance/quality control program.
- C. Certified results of all quality control testing.

PART 2 - PRODUCT

2.01 ACCEPTABLE MANUFACTURERS

- A. Synthetic Industries;
- B. Amoco; or
- C. Equal.

2.02 MATERIALS

- A. The silt fencing shall consist of long-chain polymeric fibers or filaments composed of polypropylene.
- B. The silt fencing shall be free of any chemical treatment that reduces permeability and shall be inert to chemicals commonly found in soil.
- C. The silt fencing indicated on the Technical Drawings shall have the minimum physical properties listed below:

MATERIALS AND PERFORMANCE - SECTION 02233

SILT FENCING

Property	Unit of Measure	Test Method	Value
Grab Tensile	lbs.	ASTM D4632	80
Grab Elongation	%	ASTM D4632	15
Mullen Burst	psi	ASTM D3786	250
Puncture	lbs	ASTM D4833	30
Apparent Opening Size	US Sieve Number	ASTM D4751	#10 Sieve
UV Resistance	%	ASTM D4355	80 @ 500 hrs

2.03 DELIVERY, STORAGE AND HANDLING

- A. The silt fencing shall be furnished in a protective wrapping that shall be labeled with the following information: manufacturer's name, product identification, lot #, roll #, and dimensions.

2.04 QUALITY ASSURANCE

- A. The field-delivered fabric shall meet the specification values according to the manufacturer's specification sheet. The Contractor shall submit written certification that the delivered fabric meets the manufacturer's specifications. The Contractor shall provide the quality control test results conducted by the manufacturer during the manufacturing of the silt fencing delivered to the project site. The results shall identify the sections/panels of field-delivered fabric they represent. The Contractor shall also provide the lot and roll number for the material delivered to the site.
- B. The manufacturer shall have developed and shall adhere to its own quality assurance program in the manufacture of the silt fencing.
- C. The installer shall verify in writing prior to installation that the silt fencing has not been damaged due to improper transportation, handling, or storage.

PART 3 - EXECUTION

3.01 SILT FENCING INSTALLATION

- A. The silt fencing shall be installed as depicted on the Technical Drawings and in conformance with the manufacturer's recommendations.

MATERIALS AND PERFORMANCE - SECTION 02233

SILT FENCING

3.02 WARRANTY

- A. The Contractor shall obtain from the manufacturer and submit to GE or GE's Representative, a standard warranty provided for the geotextiles.

- END OF SECTION -

MATERIALS AND PERFORMANCE - SECTION 02234

FLEXIBLE MEMBRANE LINER

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. Under this section, the Contractor shall furnish and install 60-mil thick, textured high-density polyethylene (HDPE) Flexible Membrane Liner (FML) material as shown on the Technical Drawings, and as specified herein and/or directed.
2. The Contractor shall be responsible for all Quality Assurance/Quality Control (QA/QC) testing specified herein and as indicated on the Technical Drawings. All QA/QC testing, with the exception of non-destructive tests, shall be conducted by an independent laboratory at the Contractor's expense.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section MP-02219 - Geosynthetic Drainage Composite
- B. Section MP-02232 - Geotextile Fabric
- C. Construction Quality Assurance Plan – On-Plant Consolidation Areas (CQAP)

1.03 APPLICABLE CODES, STANDARDS, SPECIFICATIONS, AND PUBLICATIONS

A. American Society for Testing and Materials (ASTM)

1. D638-01 Tensile Properties of Plastics
2. D792-00 Specific Gravity and Density of Plastics by Displacement
3. D1004-94a Initial Tear Resistance of Plastic Film and Sheeting
4. D1505-98 Density of Plastics by the Density Gradient Technique
5. D1603-01 Carbon Black in Olefin Plastics
6. D5397-99 Environmental Stress-Cracking of Ethylene Plastics
7. D5994-98 Core Thickness of Textured Geomembrane
8. D5596-94 Microscopical Examination of Pigment Dispersion in Plastic Compounds
9. D4833-97 Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
10. D4218-96 Carbon Black Content

MATERIALS AND PERFORMANCE - SECTION 02234

FLEXIBLE MEMBRANE LINER

B. Geosynthetic Research Institute (GRI)

GRI Test Method GM 13

Test Properties, Testing Frequencies and Recommended
Warrant for High-Density Polyethylene (HDPE) Smooth
and Textured Geomembranes

- C. Where reference is made to one of the above codes, standards, specifications, or publications the revisions in effect at the time of bid shall apply.

1.04 QUALIFICATIONS

A. FML Manufacturer

1. The Contractor shall submit to GE or GE's Representative for approval the following information regarding the FML Manufacturer:
 - a. Corporate background and information.
 - b. Manufacturing capabilities including:
 - Quality control procedures for manufacturing; and
 - List of material properties including certified test results, to which FML samples are attached.
 - c. A list of at least 10 completed facilities, totaling a minimum of 10,000,000 ft², for which the Manufacturer has manufactured FMLs. For each facility, the following information shall be provided:
 - Name and purpose of facility, its location, and date of installation;
 - Name of Owner, Project Manager, Designer, Fabricator (if any), and Installer; and
 - Thickness of FML, surface area of FML manufactured.
 - d. Origin (resin supplier's name, resin production plant) and identification (brand name, number) of the resin.

B. Installer

1. The Installer must be trained and approved and/or licensed by the FML Manufacturer for the installation of FML.
2. The Contractor shall submit to GE or GE's Representative for approval the following written information, relative to the Installer:

MATERIALS AND PERFORMANCE - SECTION 02234

FLEXIBLE MEMBRANE LINER

- a. Copy of Installer's letter of approval or license by the Manufacturer.
- b. Resume of the "master seamer" to be assigned to this project, including dates and duration of employment.
3. All personnel performing seaming operations shall be qualified by experience or by successfully passing seaming tests. At least one seamer shall have experience seaming a minimum of 1,000,000 ft² of FML of the type for this project, using the same type of seaming apparatus in use at the site.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Solmax Geosynthetics;
- B. GSE Lining Technology, Inc.; or
- C. Equal.

2.02 MATERIALS

A. HDPE Lining Material Specifications

1. HDPE FML material shall meet the following minimum specification values listed below and as listed in GRI GM13.

Property	Test Method	Specification Limit
		60 mil Textured
HDPE FML Resin		
Specific Gravity (min.)	ASTM D1505/D792	.940
Carbon Black Content	ASTM D1603/D4218	2.0 - 3.0%
Carbon Black Dispersion	ASTM D5596	1, 2 or 3 category All 10 views
HDPE FML Rolls		

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FLEXIBLE MEMBRANE LINER

Property	Test Method	Specification Limit
		60 mil Textured
Thickness (nominal)	ASTM D5994	60 mil
Thickness (min. avg.)		57 mil
lowest individual 8 of 10 values		54 mil
lowest individual of 10 values		51 mil
Density (min.)	ASTM D1505/D792	.940
Tensile Properties		
Tensile Strength at Break (min.)	ASTM D638 Type IV	90 ppi
Tensile Strength at Yield (min.)		126 ppi
Elongation at Break (min.)		100%
Elongation at Yield (min.)		12%
Tear Resistance (min.)	ASTM D1004	42 lbs
Puncture Resistance (min.)	ASTM D4833	90 lbs
Stress Crack Resistance	ASTM D5397	200 Hour

B. Welding Material

1. The resin used in the welding material must be identical to the liner material.

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FLEXIBLE MEMBRANE LINER

2. All welding materials shall be of a type recommended and supplied by the manufacturer and shall be delivered in the original sealed containers, each with an indelible label bearing the brand name, manufacturer's mark number, and complete directions as to proper storage.

C. Labeling FML Rolls

1. Labels on each roll or factory panel shall identify the following:
 - Thickness of the material;
 - Length and width of the roll or factory panel;
 - Manufacturer;
 - Directions to unroll the material;
 - Product identification;
 - Lot number; and
 - Roll or field panel number.

2.03 DELIVERY, HANDLING, AND STORAGE

- A. The Contractor shall be liable for all damages to the materials incurred prior to and during transportation to the site.
- B. Handling, storage, and care of the FML prior to and following installation at the site is the responsibility of the Contractor. The Contractor shall be liable for all damages to the materials incurred prior to final acceptance of the lining system by GE or GE's Representative.
- C. The Contractor shall notify GE or GE's Representative of the anticipated delivery time.

2.04 ADDITIONAL SUBMITTALS

- A. The Contractor shall submit the following items for approval at least one week prior to installation:
 1. Shop drawings that shall include:
 - a. Layout plan;
 - b. Quality control program manuals covering all phases of manufacturing and installation; and

MATERIALS AND PERFORMANCE - SECTION 02234

FLEXIBLE MEMBRANE LINER

- c. Complete and detailed written instructions for the storage, handling, installation, seaming, inspection plan fail criteria for liner inspections, and QA/QC testing procedures of the liner in compliance with these specifications and the condition of its warranty.

PART 3 - EXECUTION

3.01 FML INSTALLATION

A. Related Earthwork

- 1. The Contractor shall ensure that all related earthwork requirements under this section are complied with:
 - a. The FML installations shall be performed on a firm, smooth, soil or geotextile-covered surface free from stones or protruding objects.
 - b. No FML shall be placed onto an area that has become softened by precipitation. Appropriate methods of moisture control are the responsibility of the Contractor.
 - c. No FML shall be placed on frozen soil material. Such material shall be removed and replaced with new soil fill as specified in the Section MP-02222 - Soil Fill Materials.
 - d. The FML Installer shall certify in writing that the final surface on which the FML is to be installed is acceptable.
 - e. All surfaces on which the FML is to be installed shall be acceptable to GE or GE's Representative prior to FML installation.
 - f. Free edges of FML shall be secured so as to prevent uplift by wind or the intrusion of water under the liner. Edge protection shall include sandbags, polyethylene sheeting, or other methods as deemed necessary by the Contractor and approved by GE or GE's Representative.
 - g. The FML shall be anchored within an anchor trench constructed to the dimensions shown in the Technical Drawings. Care shall be taken while backfilling the trenches to prevent damage to the FML.

B. FML Deployment

- 1. FML shall be deployed according to the following procedures:

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FLEXIBLE MEMBRANE LINER

- a. Placement of the FML panels shall be according to the approved location and position plan provided by the Installer. Placement shall follow all instructions on the boxes or wrapping containing the FML materials that describe the proper methods of unrolling panels.
- b. The method of placement must ensure that:
 - Deployed FML must be visually inspected for uniformity, tears, punctures, blisters, or other damage or imperfections. Any such imperfections shall be immediately repaired and reinspected.
 - No equipment used shall damage the FML by handling, trafficking, leakage of hydrocarbons, or other means.
 - No personnel working on the FML shall smoke, wear damaging shoes, or engage in other activities that could damage the FML.
 - The prepared surface underlying the FML must not be allowed to deteriorate after acceptance, and must remain acceptable up to the time of FML placement and until completion of the project.
 - Adequate temporary loading and/or anchoring (e.g., sand bags), not likely to damage the FML, shall be placed to prevent uplift by wind (in case of high winds, continuous loading is recommended along edges of panels to minimize risk of wind flow under the panels).
 - Direct contact with the FML shall be minimized (i.e., the FML in excessively high-traffic areas shall be protected by geotextiles, extra FML, or other suitable materials).
- c. Any damage to the FML panels or portions of the panels as a result of placement must be replaced or repaired at no cost to GE or GE's Representative. The decision to replace or repair any panel or portions of panels shall be made by GE or GE's Representative.
- d. The Installer shall assign an "identification number" to each FML panel placed. The number system used shall be simple, logical, and shall identify the relative location in the field.

C. Seaming

1. The seaming procedures below shall be implemented, where applicable, during installation of the FML. The seaming procedures are as follows:

MATERIALS AND PERFORMANCE - SECTION 02234

FLEXIBLE MEMBRANE LINER

- a. Generally, all seams whether field or factory, shall be oriented parallel to the line of slope, not across slope. At liner penetrations and corners, the number of seams shall be minimized.
- b. The area of the FML to be seamed shall be cleaned and prepared according to the procedures specified by the material manufacturer. Any abrading of the FML shall not extend more than one-half inch on either side of the weld. Care shall be taken to eliminate or minimize the number of wrinkles and "fishmouths" resulting from seam orientation.
- c. Field seaming is prohibited when either the air or sheet temperature is below 32°F, or when the sheet temperature exceeds 122°F, or when the air temperature is above 104°F. At air or sheet temperatures between 32°F and 40°F, seaming shall be conducted directly behind a preheating device. In addition, seaming shall not be conducted when FML material is wet from precipitation, dew, fog, etc., or when winds are in excess of 20 miles per hour.
- d. Seaming shall not be performed on frozen or excessively wet underlying soil surfaces.
- e. Seams shall have an overlap beyond the weld large enough to perform destructive peel tests, but shall not exceed 5 inches.
- f. The Contractor shall perform trial seams on excess FML material. A 1-foot by 3-foot seamed liner sample shall be fabricated with the seam running down the 3-foot length in the center of the sample. Such trial seaming shall be conducted prior to the start of each seaming succession for each seaming crew, change in machine or every 4 hours, after any significant change in weather conditions or FML temperature, or after any change in seaming equipment. From each trial seam, four field test specimens shall be taken. The test specimens shall be 1-inch by 12-inch strips cut perpendicular to the trial seam. Two of these specimens shall be shear tested and two shall be peel tested using a field tensiometer, and recorded as pass (failure of liner material) or fail (failure of seam). Upon initial failure, a second trial seam shall be made; if both trial seams fail, then the seaming device and its operator shall not perform any seaming operations until the deficiencies are corrected and two successive passing trial seams are produced. Completed trial seam samples cannot be used as portions of a second sample and must be discarded.
- g. Where fishmouths occur, the material shall be cut, overlapped, and an overlap weld shall be applied. Where necessary, patching using the same liner material shall be welded to the FML sheet.

MATERIALS AND PERFORMANCE - SECTION 02234

FLEXIBLE MEMBRANE LINER

- h. Acceptable seaming methods for FML are:
 - Extrusion welding using extrudate with identical physical, chemical, and environmental properties; and
 - Hot wedge welding using a proven fusion welder and master seamer.
- i. Seaming device shall not have any sharp edges that might damage the FML. Where self-propelled seaming devices are used, it shall be necessary to prevent "bulldozing" of the device into the underlying soil.

D. Seam Testing

- 1. The Contractor shall perform nondestructive seam testing on 100 percent of field seams. The following test method and procedures may be used:
 - a. Air pressure testing may be used if double-track hot-wedge welding has been used to seam the HDPE FML. Using approved pressure testing equipment, the following procedures will be followed:
 - Seal both ends of the air channel separating the double-track hot-wedge welds;
 - Insert pressure needle into air channel and pressurize the air channel to 27 psi;
 - Monitor pressure gauge for 3 minutes and determine whether pressure is maintained without a loss of more than 2 psi; and
 - If the pressure test fails, then localize the leak and mark the area for repair.

Air pressure testing will be conducted under the direct observation of GE or GE's Representative.
 - b. Vacuum testing will be used on all seams not tested using air pressure testing. Using an approved vacuum box, the following procedures will be followed:
 - Apply a soapy water mixture over the seam;
 - Place vacuum box over soapy seam and form a tight seal;
 - Create a vacuum by reducing the vacuum box pressure to 5 psi for 10 seconds;
 - Observe through the vacuum box window any bubbles;
 - Where bubbles are observed, mark seam for repair;
 - Move vacuum box further down seam overlapping tested seam by 3 inches; and
 - Where hot-wedge seaming has been performed, the overlap must be cut back to the weld.

MATERIALS AND PERFORMANCE - SECTION 02234

FLEXIBLE MEMBRANE LINER

All vacuum testing will be conducted under the direct observation of GE or GE's Representative.

2. In addition to nondestructive seam testing, the Contractor will perform destructive testing. The destructive testing procedures are as follows:
 - a. Test samples will be prepared by the Installer every 500 feet of seam length, a minimum of one test for each seaming machine per day, or more frequently at the discretion of GE or GE's Representative. Sample location and size will be selected by GE or GE's Representative. The sample size (12 x 56 inches) will be large enough to produce three sets of test specimens for the following tests:
 - Seam Shear Strength, ASTM D4437; and
 - Peel Adhesion, ASTM D4437.
 - b. Ten specimens will compose a set. Five of these will be tested for peel and the other five for shear strength. Each specimen will be 1-inch wide and 12-inches long with the field seam at the center of the specimen. The 56-inch sample length will first be cut at the ends to produce two field peel test specimens. The remaining 54 inches will be divided up into thirds and one-third submitted to the Contractor, one-third to the independent testing laboratory, and one-third to GE or GE's Representative for storage and future reference.
 - c. Test specimens will be considered passing if the minimum values below are met or exceeded for four of the five test specimens tested by the independent laboratory. All acceptable seams will lie between two locations where samples have passed.
 - d. The cost of destructive testing will be borne by the Contractor.
 - e. Seams will meet the following minimum criteria:

Field Seam Properties	Specification Limit	Test Method
Shear Strength at Yield (lb/in width)	113 ppi	ASTM D4437
Peel Adhesion – Fusion	88 ppi and Film tear bond	ASTM D4437
Peel Adhesion - Extrusion	63 ppi and Film tear bond	ASTM D4437

3. If a sample fails destructive testing, the Contractor shall ensure that: the seam is reconstructed in each direction between the location of the sample that failed and the

MATERIALS AND PERFORMANCE - SECTION 02234

FLEXIBLE MEMBRANE LINER

location of the next acceptable sample; or the welding path is retraced to an intermediate location at least 10 feet in each direction from the location of the sample that failed the test, and a second sample is taken for an additional field test. If this second test sample passes, the seam must be then reconstructed between the location of the second test and the original sampled location. If the second sample fails, the process must be repeated.

All costs for work performed to achieve passing tests along with costs for retesting will be borne by the Contractor.

4. If double-track hot-wedge welding is used, GE or GE's Representative and the Installer must agree on the track weld that will be used in the destructive testing. The weld chosen inside or outside must be consistently tested, and must pass according to the criteria above.
5. All holes created by cutting out destructive samples will be patched by the Contractor immediately with an oval patch of the same material welded to the membrane using extrusion welding. The patch seams will be tested using a vacuum box and using the procedures described above. Work will not proceed with materials covering the FML until passing results of destructive testing have been achieved.
6. At the ends of each field seam, two field test specimens will be taken and field tested with a field tensiometer. Both specimens must pass prior to placing the membrane in the anchor trench or continuing with additional seams. Failure of these specimens will require correcting the seaming device and repair of the preceding seam according to the failure testing and procedures described above.

E. Liner Repair

1. All imperfections, flaws, construction damage, and destructive and nondestructive seam failures shall be repaired by the Installer of the FML. The appropriate methods of repair are listed below:
 - Patching, used to repair holes, tears, undispersed raw materials, and contamination by foreign matter;
 - Grinding and rewelding, used to repair small sections of extruded seams;
 - Spot welding or seaming, used to repair pinholes or other minor, localized flaws;
 - Capping, used to repair large lengths of failed seams;
 - Topping, used to repair areas of inadequate seams which have an exposed edge; and
 - Removing bad seams and replacing with a strip of new material welded into placed, used with large lengths of fusion seams.

F. Construction Material Placement and Penetrations

MATERIALS AND PERFORMANCE - SECTION 02234

FLEXIBLE MEMBRANE LINER

1. Wrinkles that develop from normal placement procedures must be controlled such that the underlying FML does not fold over. Small wrinkles, defined as having their height less than or equal to one-half their base width, may be trapped and pushed down by the overlying soil. Any wrinkle that becomes too large and uncontrollable or that folds the FML over must be brought to the attention of GE or GE's Representative. If necessary, the FML shall be uncovered, cut, laid flat, seamed by extrusion welding, and non-destructively tested.

3.02 POST-CONSTRUCTION

- A. The Installer of the FML materials shall prepare and the Contractor shall submit to GE or GE's Representative, record drawings illustrating the following information:
 - Dimensions of all FML field panels;
 - Panel locations referenced to the Technical Drawings;
 - All field seams and panels with the appropriate number or code; and
 - Location of all patches, repairs, and destructive testing samples.

3.03 WARRANTY

- A. The Contractor shall obtain and submit to GE or GE's Representative from the Manufacturer a standard warranty provided for the FML.

- END OF SECTION -

MATERIALS AND PERFORMANCE - SECTION 02271

RIPRAP

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Under this section, the Contractor shall furnish all labor, equipment, and materials, and shall perform all work necessary to place a protective covering of erosion-resistant riprap at locations shown on the Technical Drawings or as directed by GE or GE's Representative. The work shall be done in accordance with these specifications and in conformity with the lines and grades shown on the Technical Drawings.

1.02 SUBMITTALS

- A. Particle size distribution of all proposed riprap types.
- B. Proposed sources of riprap and amount of available material at each source.

PART 2 - PRODUCTS

2.01 RIPRAP

- A. Stone used for riprap shall be hard; durable; angular in shape; resistant to weathering and to water action; free from overburden, spoil, shale and organic material; and shall meet the gradation requirements for the type specified. Neither breadth nor thickness of a single stone should be less than one-third its length. Rounded stone or boulders shall not be accepted unless authorized by GE or GE's Representative. Shale and stone with shale seams are not acceptable.
- B. The sources from which the stone shall be obtained shall be selected by the Contractor for approval by GE or GE's Representative well in advance of the time the stone shall be required in the work. The acceptability of the stone shall be determined by service records and/or by suitable tests, as required by GE or GE's Representative. If testing is required, suitable samples of stone shall be taken in the presence of GE or GE's Representative prior to mobilization to the site. The approval of some rock fragments from a particular quarry site shall not be construed as constituting the approval of all rock fragments taken from that quarry.
- C. The sizes of riprap to be provided shall be the following:

Type	Maximum Stone Size (dmax)	d50
1	6"	4"

Each load of riprap shall be reasonably well graded from the smallest to the maximum size specified.

MATERIALS AND PERFORMANCE - SECTION 02271

RIPRAP

- D. In addition to meeting the gradation requirements set forth in this section for the type of riprap indicated, riprap shall consist of stones shaped as nearly as practicable in the form of right rectangular prisms.

PART 3 - EXECUTION

3.01 PLACEMENT

- A. Slopes or ditches to be protected by riprap shall be free of brush, topsoil, trees, stumps, and other objectionable material and shall be dressed to a smooth surface. All soft or spongy material shall be removed as directed by GE or GE's Representative and replaced with approved material and compacted as specified.
- B. Stone for riprap shall be placed on the prepared slopes and surfaces in a manner that shall produce a reasonably well-graded mass of stone with the minimum practicable percentage of voids. The entire mass of stone shall be placed so as to be in conformance with the lines, grades, and thicknesses shown on the Technical Drawings. Riprap shall be placed to its full course thickness in one operation and in such a manner as to avoid displacing the underlying material. Placing of riprap in layers, or by dumping into chutes, or by similar methods likely to cause segregation shall not be permitted.
- C. The larger stones shall be well distributed. All material going into riprap protection shall be so placed and distributed such that there are no large accumulations of either the larger or smaller sizes of stone.
- D. Hand placing or rearranging of individual stones by mechanical equipment may be required to the extent necessary to secure the results specified.
- E. Unless otherwise authorized by GE or GE's Representative, the riprap protection shall be placed in continuous progression with the construction of the embankment. The Contractor shall maintain the riprap protection until accepted, and any material displaced by any cause shall be replaced to the lines and grades shown on the Technical Drawings at no additional cost to GE.
- F. Riprap shall be placed so that the dimension approximately equal to the layer thickness is perpendicular to the slope surface, and so that the weight of the stone is carried by the underlying material and not by the adjacent stones. On slopes, the largest stones shall be placed at the bottom of the slope. The riprap shall be properly aligned and placed so as to minimize void spaces between adjacent stones. The spaces between the stones shall be filled with spalls of suitable size.
- G. All sediment deposited within the riprap following installation shall be promptly removed by the Contractor.

- END OF SECTION -

MATERIALS AND PERFORMANCE - SECTION 02526

HIGH-DENSITY POLYETHYLENE PIPE

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Under this section, the Contractor shall furnish all labor, materials, and equipment required to install single-wall high-density polyethylene pipe, including leachate collection lines and cleanouts, as shown on the Technical Drawings, as specified herein, and/or as directed by GE or GE's Representative.

1.02 QUALITY ASSURANCE AND SUBMITTALS

- A. The Contractor shall submit to GE or GE's Representative all applicable data demonstrating compliance with the provisions of the Technical Drawings and these Specifications in accordance with Section 3.2 of the Conditions of Work.
- B. All piping shall be inspected upon delivery to the site. Materials not in compliance with the specifications shall be removed and replaced by the Contractor at no expense to GE. The Contractor shall furnish all labor required to handle the pipe during the inspection.
- C. Resumes of certified pipe welders.
- D. Shop drawings including, but not limited to, the following:
1. Pipe material specifications.
 2. Pipe jointing techniques and procedures.
 3. Pipe and fitting details.
 4. Manufacturer's installation guides.

PART 2 - PRODUCTS

2.01 MATERIAL

- A. All pipes and fittings shall be of smooth interior and exterior, and shall be composed of high-density, high-molecular-weight material using PE3408-grade resin having a cell classification in the following range (from ASTM D-3350).

Property Designation	Property	Cell Classification Limits
1	Density	3
2	Melt Index	3-5
3	Flexural Modulus	4-5
4	Tensile Strength at Yield	4-5

MATERIALS AND PERFORMANCE - SECTION 02526

HIGH-DENSITY POLYETHYLENE PIPE

Property Designation	Property	Cell Classification Limits
5	Environmental Stress Cracking Resistance	3
6	Hydrostatic Design Basis	4
7	UV Color Code	C

- B. All HDPE pipe and fittings shall conform to ASTM D-3350.
- C. All single-wall HDPE pipe and fittings shall have an SDR 17 as specified on the Technical Drawings.
- D. The pipe shall be free of blisters, foreign inclusions, cracks, or other defects. The pipe shall be uniform as much as practicable in all physical properties. Defective pipe shall be removed from the job site.
- E. HDPE end caps should be supplied and installed where shown on the Technical Drawings.
- F. Acceptable manufacturers shall be Phillips 66 or equal.
 - 1. Acceptable products shall be Driscopipe 1000 series or equal.

2.02 PERFORATIONS

- A. Perforations shall be as shown on the Technical Drawings.

2.03 JOINTS

- A. Shavings or burrs shall not be permitted on the pipe interior surface. Joints shall be of the butt-fusion (thermo-weld) type.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Installation of all HDPE pipe and associated fittings shall conform with the manufacturer's installation standards and be completed by individuals certified for such work.
- B. Where necessary, the Contractor shall be required to field fabricate joints to ensure proper fit and alignment.

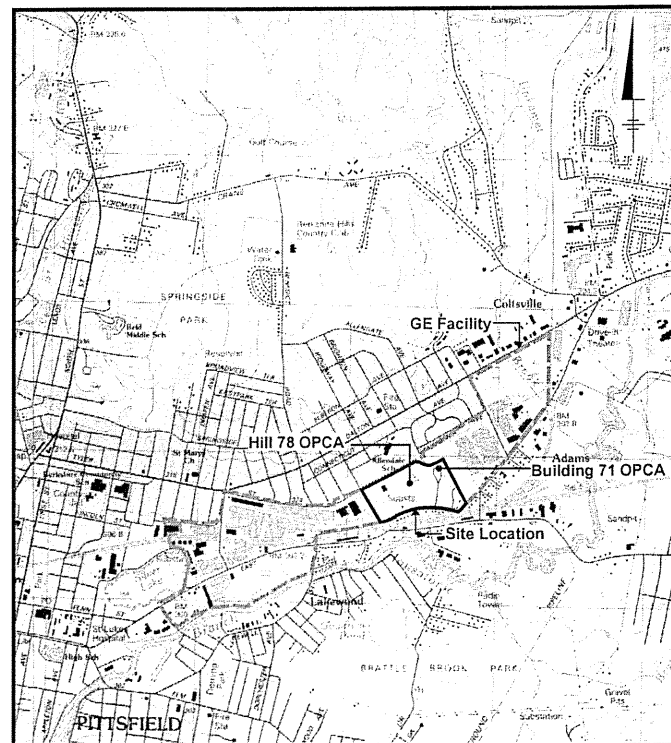
- END OF SECTION -

Attachment 1

Technical Drawings

ATTACHMENT 1 TECHNICAL DRAWINGS

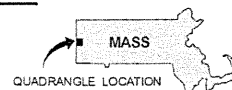
2002 OPCA CONSTRUCTION AND CONSOLIDATION ACTIVITIES



REFERENCE: PITTSFIELD EAST, MASS. USGS QUAD., 7.5 MIN. SERIES, 1988

LOCATION MAP

2000' 0 2000'



03/05/02 SYR-D54-DJH LBR YCC MRC
4312603401 36021 ldr
GE_Pittsfield_CD_OPCAs_ConfidentialReports and Presentations/Draft/Cdr

MARCH 2002

PREPARED FOR:



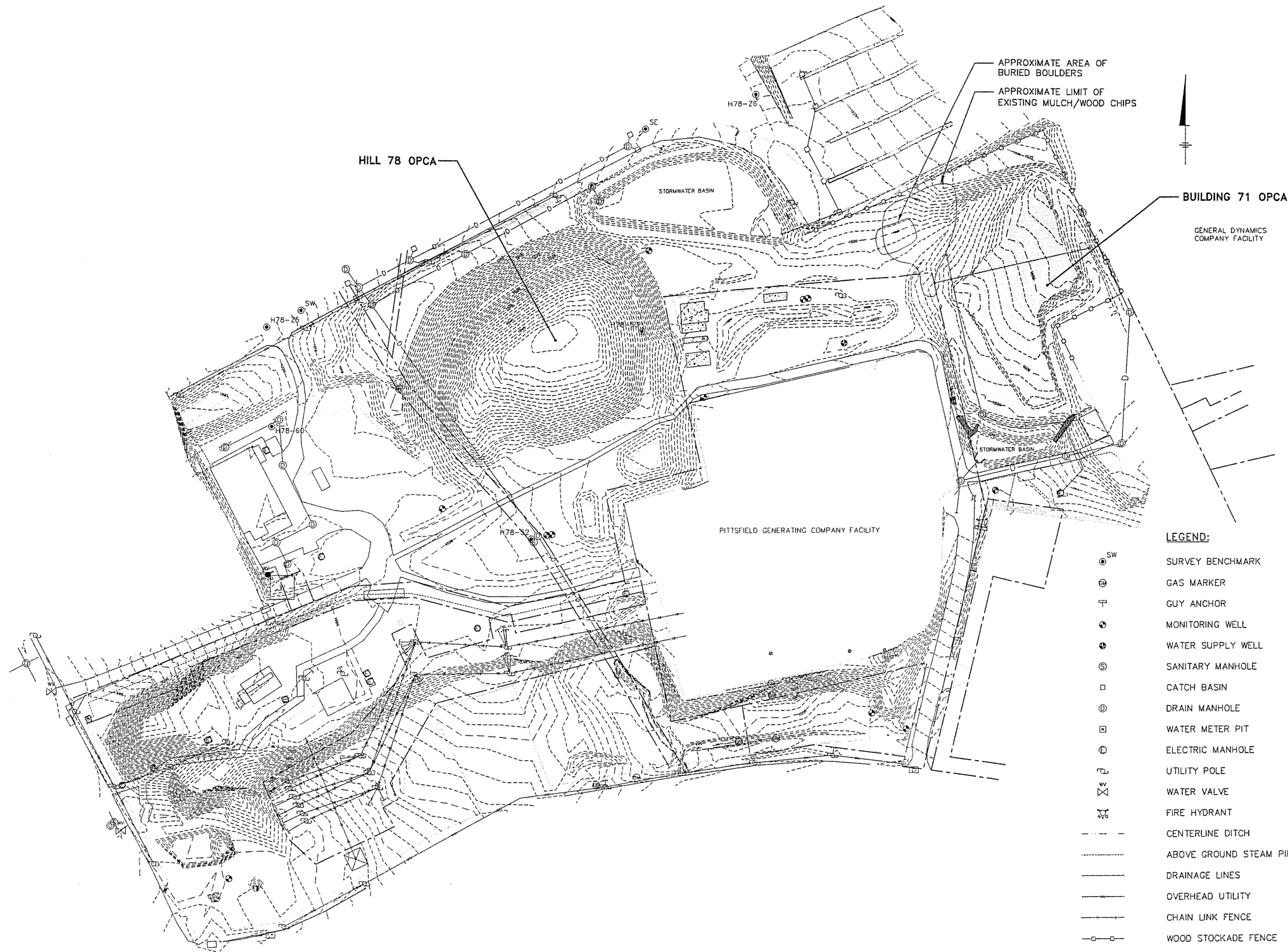
General Electric Company
Pittsfield, Massachusetts

PREPARED BY:

BBL[®]
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

INDEX TO DRAWINGS

- COVER SHEET
- 1. EXISTING SITE PLAN
- 2. EXISTING UTILITIES PLAN
- 3. SITE DEVELOPMENT PLAN
- 4. BUILDING 71 & HILL 78 OPCA CONSOLIDATION PLANS
- 5. BUILDING 71 OPCA SUBGRADE PLAN
- 6. BUILDING 71 OPCA TOP OF LINER AND LEACHATE COLLECTION SYSTEM PLAN
- 7. MATERIAL CONSOLIDATION SECTIONS
- 8. LINER SYSTEM DETAILS
- 9. LINER SYSTEM DETAILS
- 10. LEACHATE COLLECTION SYSTEM DETAILS
- 11. EROSION CONTROL AND DRAINAGE DETAILS



NOTES:

1. BASE MAP INFORMATION SHOWN ON THIS DRAWING WAS DEVELOPED FROM FIELD SURVEY DATA OBTAINED BY BLASLAND, BOUCK & LEE, INC. ON 2/10/99; AS-BUILT FIELD SURVEY OBTAINED BY MAXYMILLIAN TECHNOLOGIES AND PREPARED BY HILL ENGINEERS, ARCHITECTS, & PLANNERS, INC. ON 1/19/00 (CADD FILE NO. MX-36-2.DWG); FIELD SURVEY PERFORMED BY HILL ENGINEERS, ARCHITECTS, & PLANNERS, INC. ON 3/8/00 AND 3/14/00 (CADD FILE NO. SRV-4541.DWG) REVISION A; FIELD SURVEY OF THE BUILDING 71 OPCA, ADJACENT AREA TO THE WEST, AND THE STORMWATER BASIN TO THE NORTHWEST OBTAINED BY SK DESIGN GROUP, INC. ON 12/8/00 (PROJECT NO. 000156); AND FIELD SURVEY PERFORMED BY HILL ENGINEERS, ARCHITECTS, & PLANNERS, INC. ON 12/27/01. CERTAIN FEATURES SHOWN MAY BE APPROXIMATE SINCE SNOW AND ICE ACCUMULATIONS WERE PRESENT AT THE TIME OF CERTAIN SURVEYS.
2. ELEVATIONS SHOWN ARE REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM (NGVD 1929).
3. HORIZONTAL DATUM IS REFERENCED TO THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM (NAD 1927).
4. CONTOUR INTERVAL EQUALS 1 FOOT.
5. CONTRACTOR SHALL VERIFY THE PRESENCE AND LOCATION OF ALL ABOVE GROUND AND UNDERGROUND SITE FEATURES IN THE VICINITY OF PROPOSED CONSTRUCTION/CONSOLIDATION ACTIVITIES PRIOR TO COMMENCEMENT OF SITE WORK. ADDITIONAL SITE FEATURES MAY BE PRESENT WHICH ARE NOT SHOWN ON THIS DRAWING. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH GE TO DETERMINE THE PRESENCE AND LOCATION OF SUCH FEATURES SHOULD THEY EXIST (AND WHICH MAY NOT BE SHOWN) AND THE LOCATION OF ON-SITE EASEMENTS, LEASE LINES, AND RIGHT-OF-WAYS.
6. CONTRACTOR SHALL ASSUME EXISTING FENCING AT PERIMETER OF SITE IS GE'S PROPERTY LINE. NO WORK SHALL BE PERFORMED OUTSIDE THE PROPERTY LINE WITHOUT GE'S PRIOR APPROVAL.
7. CONTRACTOR SHALL FURNISH AND PLACE PROPER GUARDS FOR PREVENTION OF ACCIDENTS.
8. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THIS CONTRACT. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS FOR THE SAFETY OF, AND SHALL PROVIDE THE NECESSARY PRECAUTION TO PREVENT DAMAGE, INJURY, OR LOSS TO ALL EMPLOYEES ON THE WORK SITE AND ANY OTHER PERSONS WHO MAY BE AFFECTED THEREBY.
9. EXISTING SURFACES OR FEATURES NOT SPECIFIED FOR MODIFICATION THAT ARE DAMAGED OR DESTROYED AS A RESULT OF WORK PERFORMED UNDER THIS CONTRACT SHALL BE RESTORED BY THE CONTRACTOR TO THEIR PRECONSTRUCTION CONDITION AT THE CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF GE, IN A TIMELY MANNER.
10. ALL CONTRACTOR-RELATED ACTIVITIES SHALL BE PERFORMED IN A MANNER WHICH ALLOWS FOR ALL NECESSARY OPERATING ACTIVITIES ASSOCIATED WITH THE PITTSFIELD GENERATING COMPANY AND GENERAL DYNAMICS COMPANY FACILITIES. ANY WORK DEEMED NECESSARY WHICH MAY AFFECT THOSE FACILITIES SHALL BE BROUGHT TO THE ATTENTION OF GE PRIOR TO COMMENCEMENT OF SUCH WORK. GE SHALL PROVIDE THE CONTRACTOR WITH AUTHORIZATION TO PROCEED PROVIDED GE AND THE AFFECTED PARTY(IES) DEEM THE ACTION NECESSARY AND ACCEPTABLE.
11. LEASE AND EASEMENT LINE LOCATIONS SHOWN ON THIS DRAWING DIGITIZED FROM PLAN PREPARED BY DESIGN GROUP, INC. ENTITLED "PLAN OF LAND SURVEYED FOR GENERAL ELECTRIC COMPANY", DATED FEBRUARY 18, 1993 (PROJECT NO. 930004) AND ARE APPROXIMATE ONLY.

LEGEND:

- SW SURVEY BENCHMARK
- ⊕ GAS MARKER
- ⊕ GUY ANCHOR
- ⊕ MONITORING WELL
- ⊕ WATER SUPPLY WELL
- ⊕ SANITARY MANHOLE
- ⊕ CATCH BASIN
- ⊕ DRAIN MANHOLE
- ⊕ WATER METER PIT
- ⊕ ELECTRIC MANHOLE
- ⊕ UTILITY POLE
- ⊕ WATER VALVE
- ⊕ FIRE HYDRANT
- CENTERLINE DITCH
- ABOVE GROUND STEAM PIPE
- DRAINAGE LINES
- OVERHEAD UTILITY
- CHAIN LINK FENCE
- WOOD STOCKADE FENCE
- APPROXIMATE LEASE AND EASEMENT LINE LOCATION (SEE NOTE 11)
- INFERRED PROPERTY LINE LOCATION
- INDEX CONTOUR LINE
- INTERMEDIATE CONTOUR LINE
- AREA OF EXISTING TARPULINS
- VEGETATION

X: 40136X00, 40136X01.DWG
L: ON=*, OFF=REF*
P: PAGESET/PLT-COL
3/25/02 SYR-54-KMD KMD DJP
40136046/40131G01.DWG
GE_PITTSFIELD_CO_OPCAS_CONFIDENTIAL/REPORTS AND PRESENTATIONS/DRAFT/DWG

Graphic Scale			
100' 0 100' 200'			
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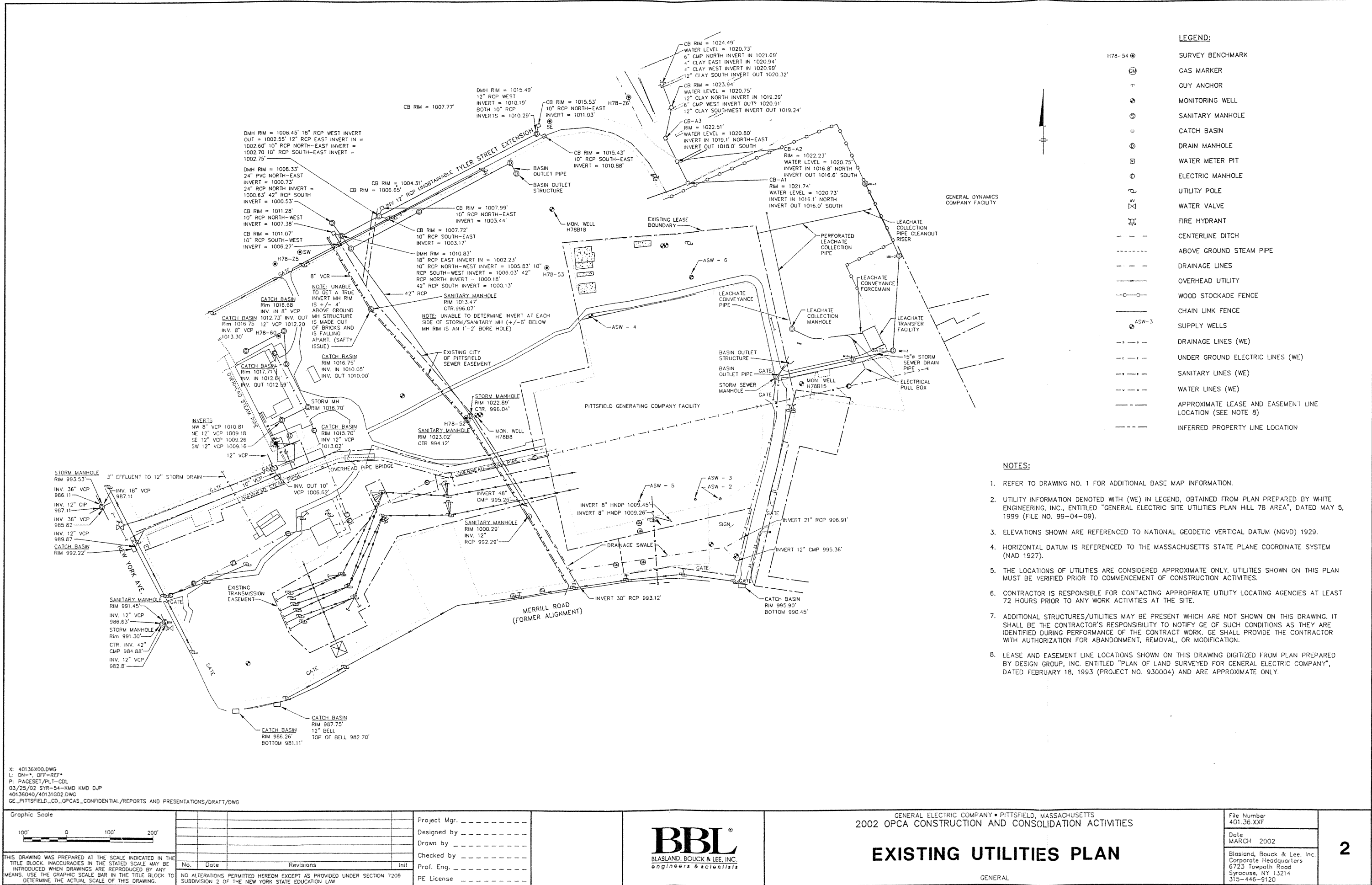
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GENERAL ELECTRIC COMPANY • PITTSFIELD, MASSACHUSETTS
2002 OPCA CONSTRUCTION AND CONSOLIDATION ACTIVITIES

EXISTING SITE PLAN

GENERAL

File Number
401.36.XXF
Date
MARCH 2002
Blasland, Bouck & Lee, Inc.
Corporate Headquarters
6723 Towpath Road
Syracuse, NY 13214
315-446-9120



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No.	Date	Revisions	Init.

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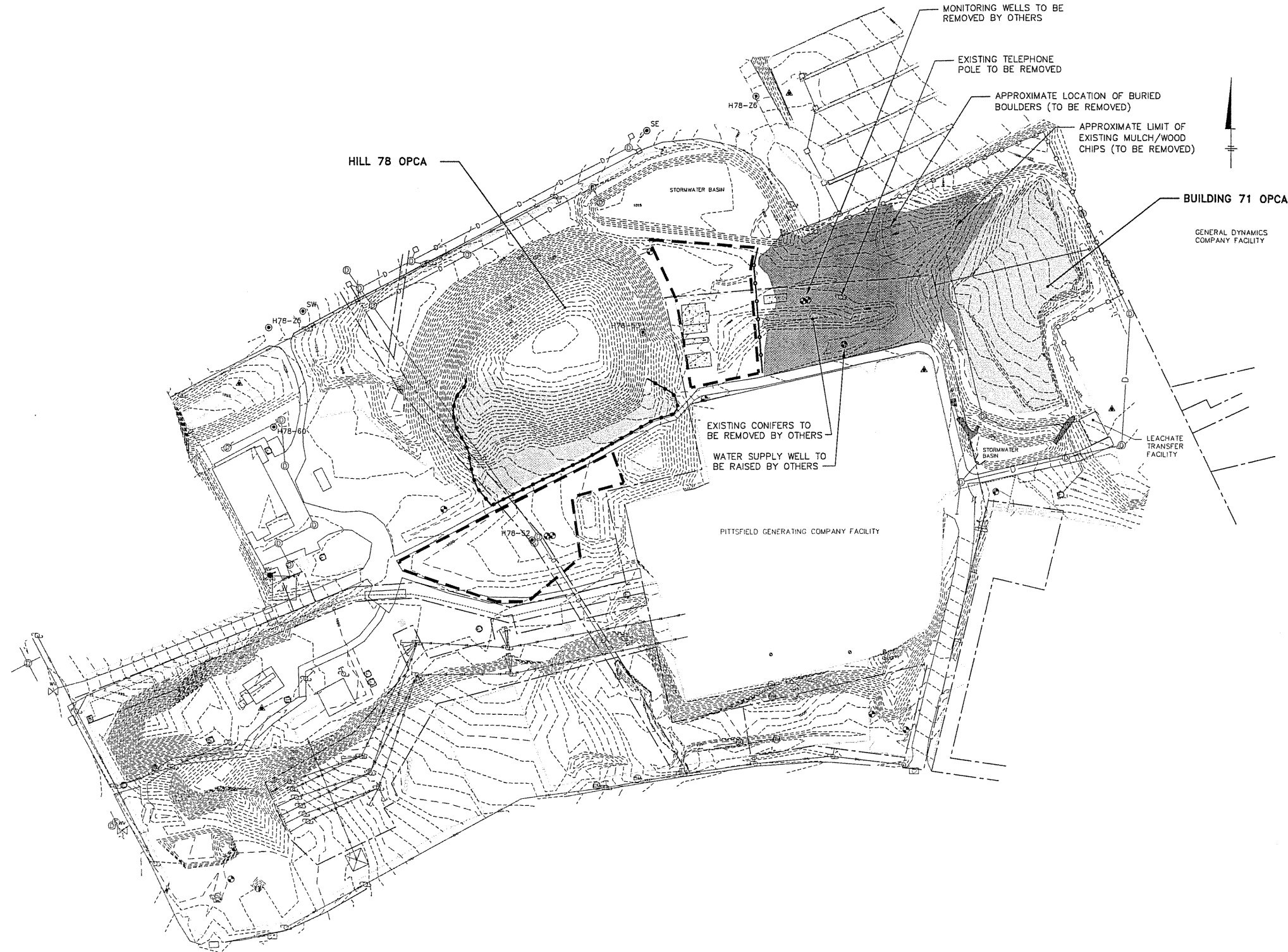
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2002 OPCA CONSTRUCTION AND CONSOLIDATION ACTIVITIES

EXISTING UTILITIES PLAN

GENERAL

File Number 401.36.XXF
Date MARCH 2002
Blasland, Bouck & Lee, Inc. Corporate Headquarters 6723 Towpath Road Syracuse, NY 13214 315-446-9120



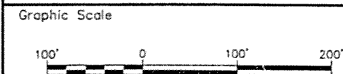
LEGEND:

- APPROXIMATE SILT FENCE LOCATION (SEE NOTE 2)
- APPROXIMATE SILT FENCE/STRAW BALE LOCATION (SEE NOTE 2)
- APPROXIMATE AREA OF CONSOLIDATION ACTIVITIES (SEE NOTE 3)
- APPROXIMATE AREA OF NEW CONSTRUCTION ACTIVITIES (SEE NOTE 4)
- APPROXIMATE AIR MONITORING LOCATION (SEE NOTE 5)
- APPROXIMATE LIMITS OF CONTRACTOR MATERIALS AND EQUIPMENT STAGING AREA (SEE NOTE 7)
- CONCRETE PAD TO BE REMOVED WHERE NECESSARY TO FACILITATE CONSTRUCTION OF BUILDING 71 OPCA
- APPROXIMATE LEASE AND EASEMENT LINE LOCATION (SEE NOTE 9)
- INFERRED PROPERTY LINE LOCATION

NOTES:

1. REFER TO DRAWING NO. 1 FOR ADDITIONAL BASE MAP INFORMATION.
2. SILT FENCE AND STRAW BALES TO BE INSTALLED PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES. THE LOCATION OF SILT FENCE AND STRAW BALES SHOWN ON THIS DRAWING MAY BE ADJUSTED AT TIME OF CONSTRUCTION BASED ON SITE CONDITIONS. ADDITIONAL SILT FENCE AND STRAW BALES MAY NEED TO BE INSTALLED AT THE DISCRETION OF GE.
3. LIMIT OF HILL 78 ON-PLANT CONSOLIDATION AREA REPRESENTS APPROXIMATE AREA FOR NON-TSCA MATERIAL CONSOLIDATION PLACEMENT. LIMIT OF BUILDING 71 ON-PLANT CONSOLIDATION AREA REPRESENTS APPROXIMATE AREA FOR TSCA MATERIAL CONSOLIDATION PLACEMENT.
4. LIMIT OF NEW CONSTRUCTION ACTIVITIES REPRESENTS APPROXIMATE AREA FOR THE EXPANSION OF THE BUILDING 71 OPCA.
5. AIR MONITORING STATIONS WILL BE INSTALLED (BY OTHERS) PRIOR TO COMMENCEMENT OF CONSTRUCTION. THE LOCATION OF AIR MONITORING STATIONS SHOWN ON THIS DRAWING ARE APPROXIMATE ONLY. ACTUAL LOCATIONS TO BE DETERMINED BASED ON SITE CONDITIONS AT TIME OF CONSTRUCTION.
6. EXISTING SANITARY SEWER AND STORMWATER DRAINAGE FEATURES (E.G., DITCHES, PIPES, AND CATCH BASINS) IN THE VICINITY OF THE CONSTRUCTION AND CONSOLIDATION AREAS, ANCILLARY WORK AREAS, AND VEHICLE ACCESS ROUTES TO BE PROTECTED, AS NECESSARY, AGAINST DAMAGE AND POTENTIAL SOIL/SEDIMENT MIGRATION.
7. IF NECESSARY, MATERIALS CURRENTLY BEING STORED WITHIN THE DESIGNATED STAGING AREA WILL BE REMOVED BY OTHERS.
8. CONTRACTOR SHALL CLEAR ONLY THOSE AREAS NECESSARY FOR ITS OPERATIONS. TO THE EXTENT POSSIBLE, EXISTING VEGETATION SHALL REMAIN UNDISTURBED.
9. LEASE AND EASEMENT LINE LOCATIONS SHOWN ON THIS DRAWING DIGITIZED FROM PLAN PREPARED BY DESIGN GROUP, INC. ENTITLED "PLAN OF LAND SURVEYED FOR GENERAL ELECTRIC COMPANY", DATED FEBRUARY 18, 1993 (PROJECT NO. 930004) AND ARE APPROXIMATE ONLY.

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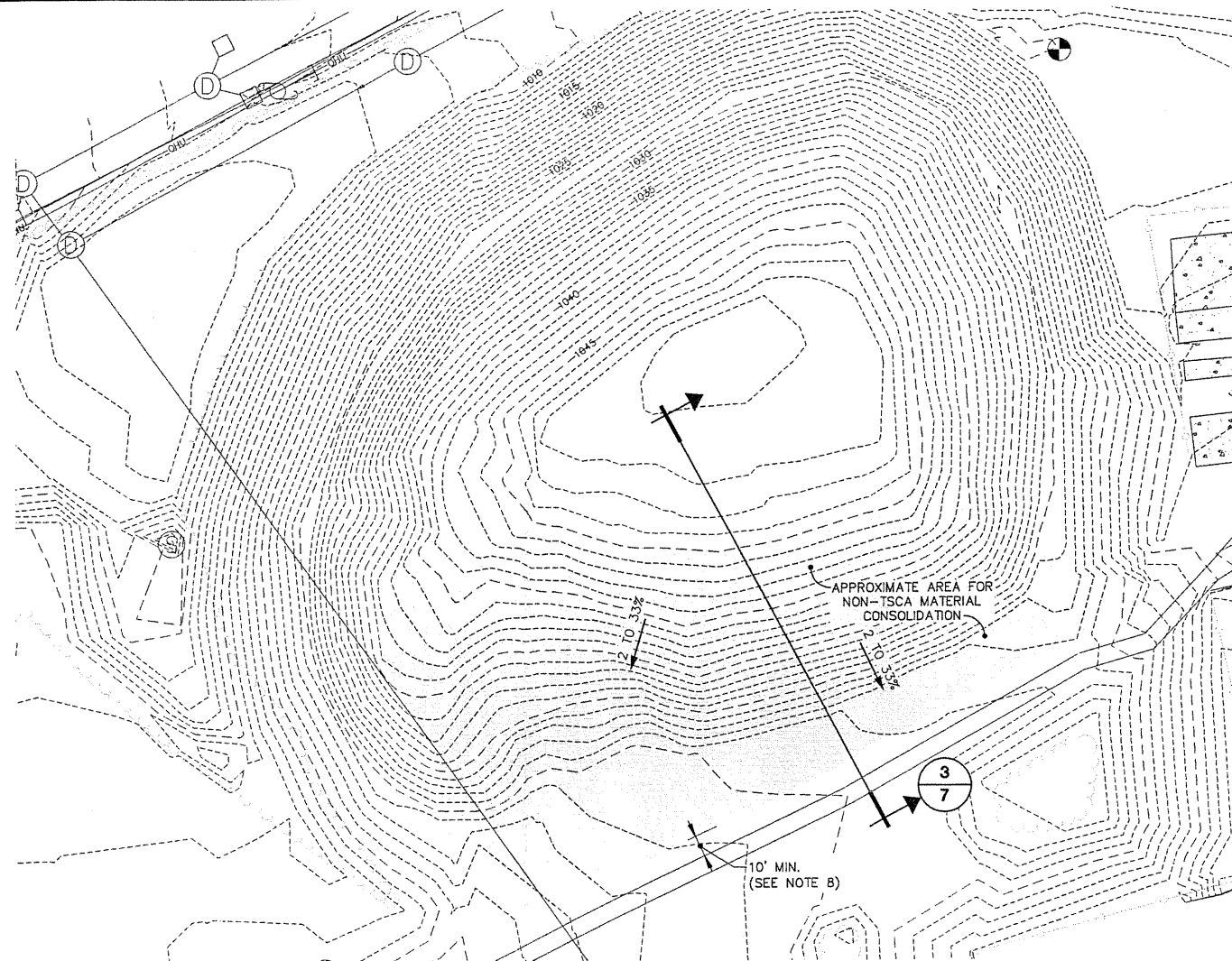
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GENERAL ELECTRIC COMPANY • PITTSFIELD, MASSACHUSETTS
 2002 OPCA CONSTRUCTION AND CONSOLIDATION ACTIVITIES

SITE DEVELOPMENT PLAN

GENERAL

File Number
 401.36.XXF
 Date
 MARCH 2002
 Blasland, Bouck & Lee, Inc.
 Corporate Headquarters
 6723 Towpath Road
 Syracuse, NY 13214
 315-446-9120



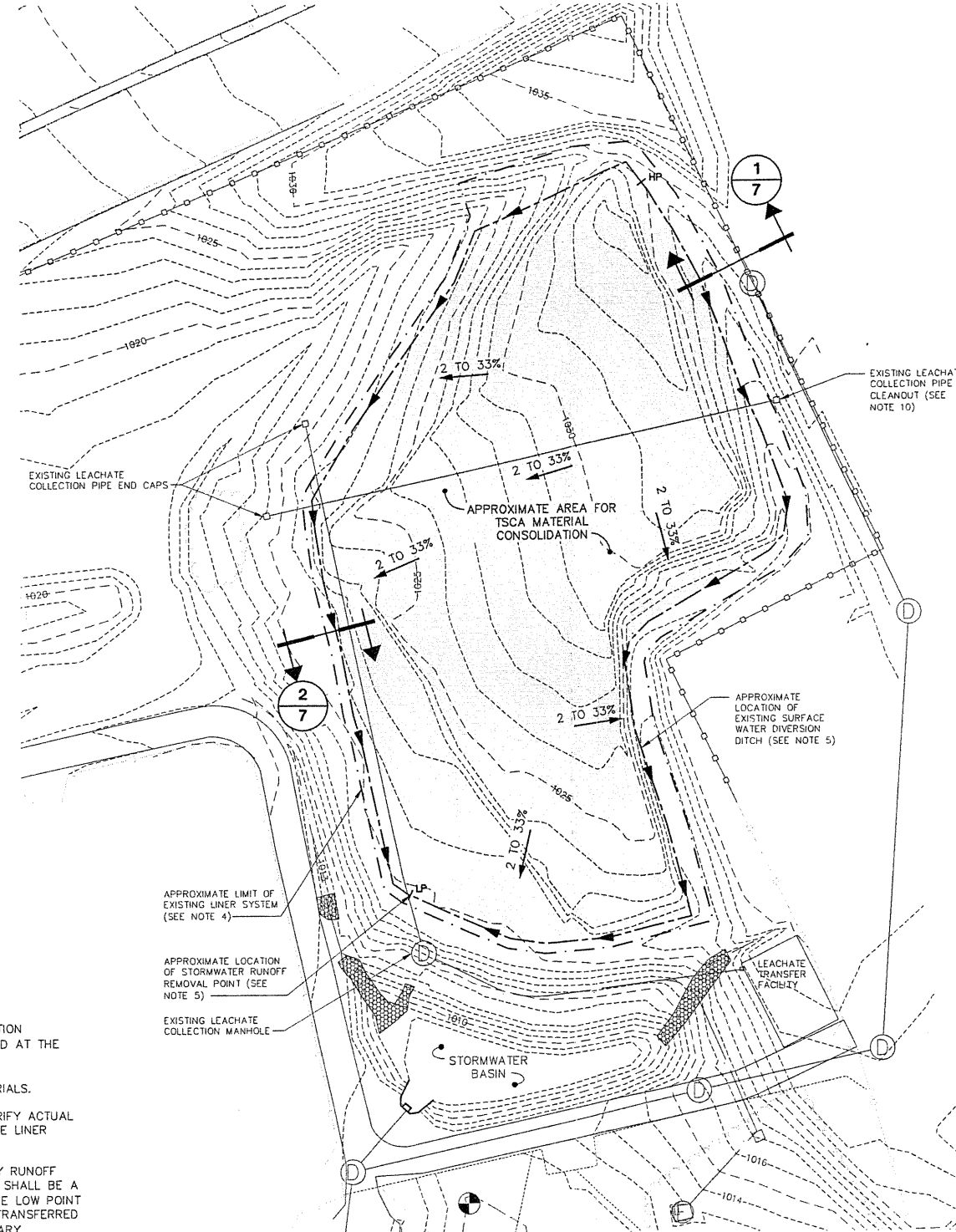
HILL 78 OPCA

LEGEND:

- 1020--- EXISTING INDEX CONTOUR LINE
- EXISTING INTERMEDIATE CONTOUR LINE
- 1/8 DETAIL/SECTION REFERENCE NUMBER
- DRAWING REFERENCE NUMBER
- APPROXIMATE AREA FOR MATERIAL CONSOLIDATION
- +HP +LP PROPOSED HIGH POINT/LOW POINT
- APPROXIMATE DIRECTION OF MATERIAL PLACEMENT WITH MINIMUM AND MAXIMUM SLOPES
- -- -- -- -- APPROXIMATE LIMIT OF LINER SYSTEM (SEE NOTE 4)
- -- -- -- -- APPROXIMATE LOCATION OF SURFACE WATER DIVERSION DITCH (SEE NOTE 5)

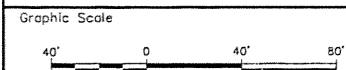
NOTES:

1. REFER TO DRAWING NO. 1 FOR ADDITIONAL BASE MAP INFORMATION.
2. CONTRACTOR SHALL NOT DAMAGE THE EXISTING BUILDING 71 OPCA LINER SYSTEM DURING PLACEMENT OF CONSOLIDATION MATERIALS. ANY DAMAGE TO THE LINER SYSTEM AS A RESULT OF THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF GE.
3. CONTRACTOR SHALL USE "LOW-GROUND PRESSURE" EQUIPMENT TO PLACE CONSOLIDATION AND INTERIM COVER MATERIALS.
4. LIMIT OF EXISTING BUILDING 71 OPCA LINER SYSTEM DEPICTED IS APPROXIMATE ONLY. CONTRACTOR SHALL FIELD VERIFY ACTUAL LIMIT PRIOR TO GRADING AND PLACING CONSOLIDATION MATERIALS TO ENSURE PLACEMENT IS WITHIN THE LIMIT OF THE LINER SYSTEM.
5. SURFACE WATER DIVERSION DITCHES SHALL HAVE A MINIMUM 2% SLOPE AND ARE INTENDED TO COLLECT AND CONVEY RUNOFF DURING FILL OPERATIONS TO A LOW POINT AT THE SOUTHWEST CORNER OF THE BUILDING 71 OPCA. THE LOW POINT SHALL BE A MINIMUM 2' DEEP, 400 SF AREA. CONTRACTOR SHALL PROVIDE A MEANS OF REMOVING COLLECTED RUNOFF FROM THE LOW POINT AND DIVERSION DITCH AS NECESSARY TO RETAIN RUNOFF WITHIN THE LINED AREAS. COLLECTED RUNOFF SHALL BE TRANSFERRED TO THE EXISTING LEACHATE COLLECTION MANHOLE. ALL PIPE/HOSE OUTSIDE THE LINED AREAS SHALL HAVE SECONDARY CONTAINMENT.
6. CONTRACTOR SHALL PLACE MATERIALS IN THE HILL 78 AND BUILDING 71 OPCAS TO ACHIEVE A GRADE OF NO LESS THAN 2%, AND NO GREATER THAN 33%.
7. MATERIAL SHALL BE PLACED IN A UNIFORM MANNER TO AVOID LOCALIZED HIGH POINTS AND LOW POINTS AND TO PROMOTE POSITIVE DRAINAGE TO THE TEMPORARY SURFACE WATER DIVERSION DITCHES.
8. FOR HILL 78 OPCA, CONTRACTOR SHALL MAINTAIN A MINIMUM OFFSET OF 10 FEET FROM THE EDGE OF THE EXISTING ROAD TO THE LIMIT OF MATERIAL CONSOLIDATION.
9. THE CONTRACTOR SHALL CONTROL OPERATIONS SUCH THAT A MINIMUM OF 50% OF THE BUILDING 71 OPCA HAS TARPS ON IT AT ANY ONE TIME. TARPS SHALL BE INSTALLED OVER ALL EXPOSED MATERIAL IMMEDIATELY UPON INCLEMENT WEATHER.
10. CONTRACTOR SHALL PLACE TWO LAYERS OF TYPE 1 GEOTEXTILE OVER EXISTING DAMAGED GEOTEXTILE AT CLEANOUT RISER PIPE. THE TWO LAYERS OF GEOTEXTILE SHALL BE COVERED BY 6" OF SOIL MATERIAL.



BUILDING 71 OPCA

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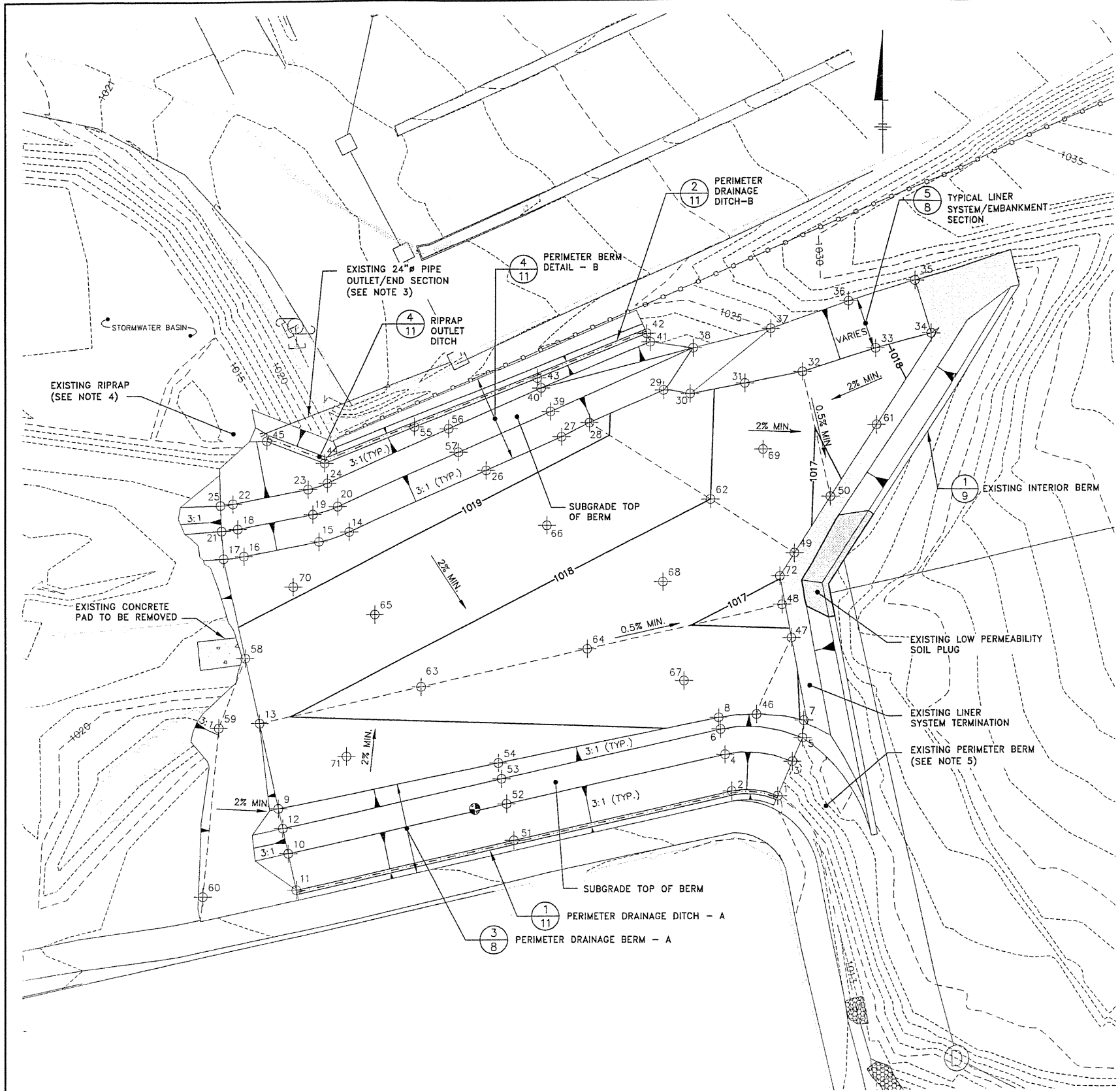
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2002 OPCA CONSTRUCTION AND CONSOLIDATION ACTIVITIES

BUILDING 71 & HILL 78 OPCA CONSOLIDATION PLANS

GENERAL

File Number
401.36.XXF
Date
MARCH 2002
Blasland, Bouck & Lee, Inc.
Corporate Headquarters
6723 Iowpath Road
Syracuse, NY 13214
315-446-9120



SURVEY CONTROL INFORMATION CONSTRUCTION POINTS					
POINT NO.	NORTHING	EASTING	EXISTING ELEV.	PROP. ELEV.	AS-BUILT ELEV.*
1	535661.80	136596.62	1014.8	1013.66	
2	535664.16	136573.99	1016.0	1013.78	
3	535678.36	136603.81	1017.6	1019.66	
4	535681.89	136570.78	1016.6	1019.78	
5	535689.77	136608.77	1019.1	1019.66	
6	535694.10	136568.57	1017.3	1019.78	
7	535698.20	136609.47	1019.7	1016.93	
8	535699.74	136567.73	1016.9	1017.88	
9	535656.43	136353.37	1018.6	1018.89	
10	535634.72	136358.18	1018.5	1022.17	
11	535617.15	136362.08	1018.5	1016.17	
12	535646.83	136355.50	1018.6	1022.17	
13	535697.60	136344.24	1021.9	1018.08	
14	535789.95	136387.83	1018.3	1019.33	
15	535785.24	136373.01	1018.1	1019.38	
16	535778.28	136336.57	1017.6	1019.58	
17	535777.07	136326.70	1016.8	1019.65	
18	535791.42	136333.56	1018.1	1024.08	
19	535798.42	136370.02	1019.4	1023.88	
20	535802.27	136382.18	1019.8	1023.84	
21	535790.49	136325.76	1017.6	1024.14	
22	535803.60	136331.22	1018.5	1024.08	
23	535810.60	136367.68	1020.6	1023.88	
24	535813.58	136377.10	1021.0	1023.85	
25	535802.88	136325.18	1018.1	1024.13	
26	535819.45	136454.54	1019.8	1019.25	
27	535835.69	136491.42	1020.4	1019.20	
28	535842.59	136505.15	1020.8	1019.20	
29	535858.33	136541.19	1021.2	1018.49	
30	535856.47	136554.04	1020.7	1018.23	
31	535861.45	136580.84	1021.4	1017.70	
32	535866.82	136609.07	1021.3	1017.14	
33	535877.99	136644.40	1020.4	1017.87	
34	535885.26	136671.27	1020.1	1018.42	
35	535910.83	136663.41	1027.4	1027.10	
36	535900.81	136631.41	1027.3	1025.86	
37	535887.77	136593.63	1025.2	1024.77	
38	535878.67	136555.49	1022.4	1022.41	
39	535848.07	136485.97	1021.3	1023.71	
40	535859.58	136481.35	1022.1	1023.71	
41	535881.81	136534.70	1023.2	1024.91	
42	535885.97	136532.96	1023.5	1023.41	
43	535864.44	136479.39	1022.4	1021.98	
44	535823.28	136375.76	1021.7	1020.74	
45	535834.16	136347.77	1016.8	1015.00	
46	535701.23	136586.32	1016.6	1017.70	
47	535738.02	136603.54	1019.8	1017.09	
48	535754.12	136599.02	1018.9	1016.77	
49	535778.94	136605.09	1019.1	1017.16	
50	535806.11	136622.54	1018.8	1016.83	
51	535640.65	136468.04	1018.2	1014.97	
52	535658.30	136464.48	1017.8	1020.97	
53	535670.46	136462.04	1018.0	1020.98	
54	535678.08	136460.50	1018.3	1018.39	
55	535840.76	136419.84	1021.7	1021.27	
56	535839.77	136436.32	1021.3	1023.77	
57	535828.31	136441.07	1020.5	1023.77	
58	535729.05	136337.26	1018.3	1018.70	
59	535695.31	136324.37	1022.1	1018.38	
60	535613.68	136316.49	1018.7	1018.00	
61	535840.92	136644.89	1019.2	1017.54	
62	535805.18	136563.89	1017.6	1018.00	
63	535715.10	136423.13	1020.2	1017.67	
64	535733.04	136504.02	1017.4	1017.26	
65	535750.05	136400.52	1018.0	1018.50	
66	535792.68	136484.25	1018.3	1018.50	
67	535717.60	136550.96	1016.4	1017.53	
68	535765.36	136540.79	1016.7	1017.50	
69	535829.29	136589.74	1017.9	1017.50	
70	535763.47	136360.64	1017.3	1019.10	
71	535681.70	136386.54	1018.9	1018.36	
72	535767.84	136597.96	1018.0	1017.03	

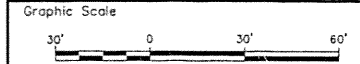
* AS-BUILT INFORMATION TO BE COMPLETED BY CONTRACTOR AND INCLUDED WITH RECORD DRAWINGS.

SURVEY CONTROL INFORMATION CONSTRUCTION RADIUS	
ARC SEGMENT (POINT NO.)	RADIUS (FT.)
3 TO 4	54.0
5 TO 6	66.4
18 TO 21	55.0
19 TO 20	55.0

- LEGEND
- 1018 PROPOSED CONTOUR LINE
 - x 1018.2 SPOT ELEVATION
 - CHANGE-IN-GRADE
 - PERIMETER DRAINAGE DITCH
 - 1 8 DETAIL REFERENCE NUMBER
 - 1 8 DRAWING REFERENCE NUMBER
 - 1 CONSTRUCTION SURVEY CONTROL POINT (SEE TABLE ON THIS DRAWING)

- NOTES:
- REFER TO DRAWING NO. 1 FOR ADDITIONAL BASE MAP INFORMATION.
 - PROPOSED GRADES/ELEVATIONS SHOWN WITHIN INBOARD CREST OF BERMS AND EMBANKMENT REPRESENT TOP OF SUBGRADE. ALL OTHER PROPOSED GRADES/ELEVATIONS REPRESENT FINAL GRADE.
 - CONTRACTOR SHALL NOT DAMAGE THE EXISTING 24" OUTLET PIPE AND END SECTION. ANY MODIFICATIONS TO THE OUTLET PIPE AND END SECTION DEEMED NECESSARY BY THE CONTRACTOR SHALL BE BROUGHT TO THE ATTENTION OF GE FOR REVIEW AND APPROVAL PRIOR TO THE INITIATION OF THE WORK.
 - EXISTING RIPRAP AND GEOTEXTILE TO BE REMOVED AS NECESSARY TO FACILITATE RIPRAP OUTLET DITCH CONSTRUCTION. REMOVED RIPRAP TO BE REUSED IN NEW RIPRAP OUTLET DITCH.
 - ADDITIONAL GRADING FOR TIE-IN OF NEW PERIMETER BERM WITH EXISTING PERIMETER BERM MAY BE REQUIRED (NOT SHOWN).
 - CONTRACTOR SHALL VERIFY SUBGRADE/LINER SYSTEM/LEACHATE COLLECTION PIPE TIE-IN CONDITIONS ARE IN ACCORDANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS PRIOR TO THEIR CONSTRUCTION. DISCREPANCIES IDENTIFIED BY THE CONTRACTOR SHALL BE BROUGHT TO THE ATTENTION OF GE.
 - SURVEY TOLERANCE IS $\pm 0.05'$ UNLESS OTHERWISE APPROVED BY GE OR GE'S REPRESENTATIVE.
 - CONTRACTOR SHALL NOTE THAT ALTHOUGH A PRE-CONSTRUCTION SURVEY HAS BEEN PERFORMED BY OTHERS, ANY NOTED DISCREPANCIES SHALL BE BROUGHT TO GE'S ATTENTION AND ADDRESSED ACCORDINGLY.

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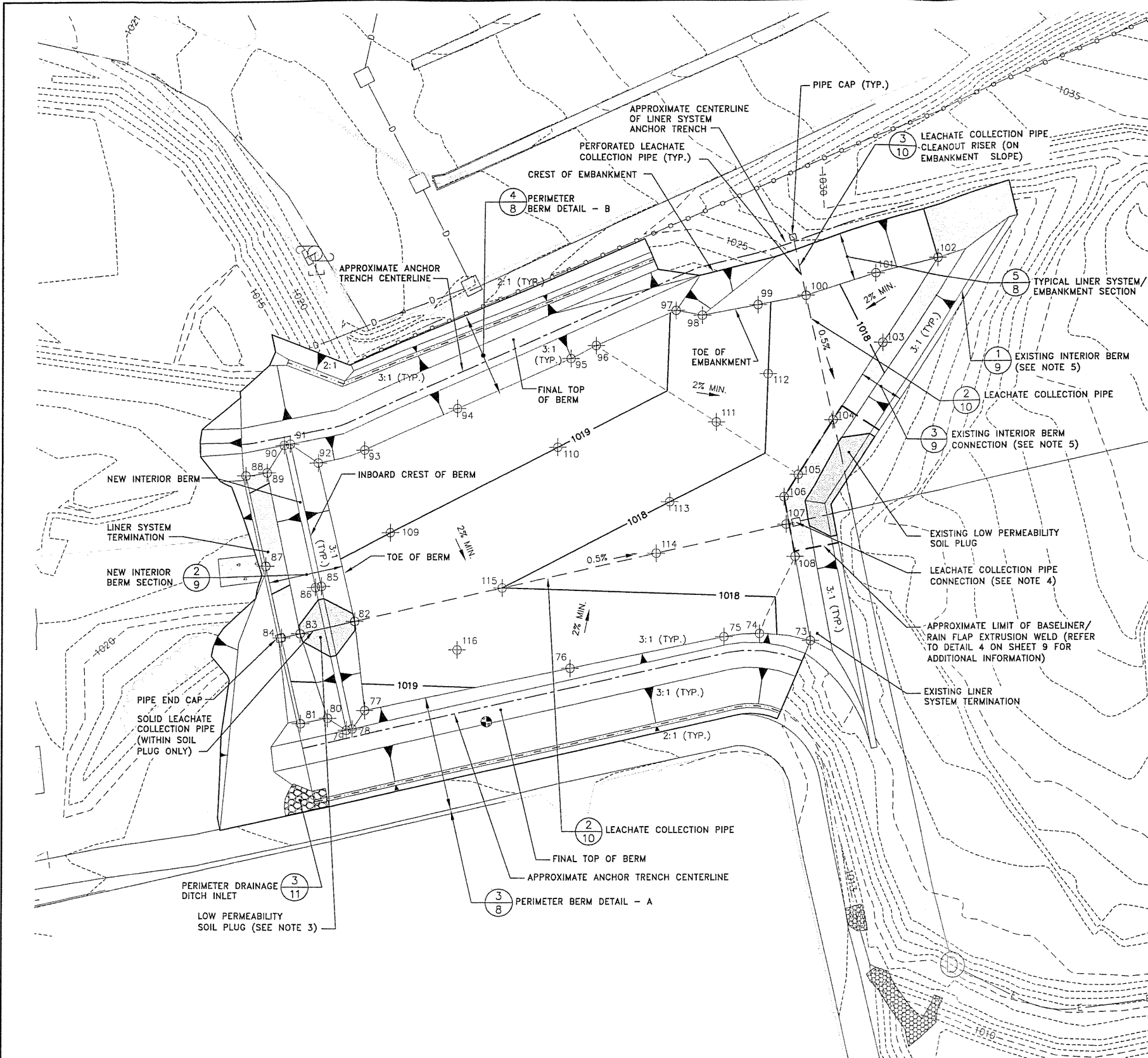


GENERAL ELECTRIC COMPANY • PITTSFIELD, MASSACHUSETTS
2002 OPCA CONSTRUCTION AND CONSOLIDATION ACTIVITIES

BUILDING 71 OPCA SUBGRADE PLAN

GENERAL

File Number
401.36.XXF
Date
MARCH 2002
Blasland, Bouck & Lee, Inc.
Corporate Headquarters
6723 Towpath Road
Syracuse, NY 13214
315-446-9120



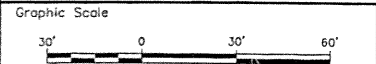
SURVEY CONTROL INFORMATION				CONSTRUCTION POINTS	
POINT NO.	NORTHING	EASTING	ELEVATION	AS-BUILT ELEV.*	DESCRIPTION
73	535696.16	136611.36	1017.36		BERM TOE
74	535699.75	136585.76	1018.20		BERM TOE
75	535698.16	136567.96	1018.41		BERM TOE
76	535682.55	136490.69	1018.78		BERM TOE
77	535661.72	136387.60	1019.26		BERM TOE
78	535652.54	136381.25	1021.88		BERM CREST
79	535651.89	136378.32	1021.92		BERM CREST
80	535657.92	136368.75	1019.35		BERM TOE
81	535655.18	136355.18	1019.42		BERM TOE
82	535706.07	136382.45	1018.38		FLOOR
83	535699.97	136354.92	1018.52		FLOOR
84	535697.92	136345.70	1018.57		FLOOR
85	535723.53	136365.50	1018.85		BERM CREST
86	535722.93	136362.56	1018.86		BERM CREST
87	535733.55	136337.80	1019.28		FLOOR
88	535778.72	136327.77	1020.17		BERM TOE
89	535780.24	136338.36	1020.10		BERM TOE
90	535793.96	136346.80	1024.01		BERM CREST
91	535794.53	136349.75	1023.99		BERM CREST
92	535785.08	136363.69	1019.96		BERM TOE
93	535791.40	136387.17	1019.86		BERM TOE
94	535812.15	136434.02	1019.80		BERM TOE
95	535837.15	136490.78	1019.73		BERM TOE
96	535843.59	136503.59	1019.73		BERM TOE
97	535861.16	136543.81	1018.94		BERM TOE
98	535858.61	136556.75	1018.68		EMBANK TOE
99	535863.79	136584.58	1018.13		EMBANK TOE
100	535868.31	136608.74	1017.65		EMBANK TOE
101	535879.44	136643.80	1018.37		EMBANK TOE
102	535887.89	136675.06	1019.01		EMBANK TOE
103	535844.79	136647.38	1018.12		FLOOR
104	535806.11	136622.54	1017.33		FLOOR
105	535778.94	136605.09	1017.66		FLOOR
106	535767.84	136597.96	1017.53		FLOOR
107	535754.12	136599.02	1017.27		FLOOR
108	535738.02	136603.54	1017.59		FLOOR
109	535750.05	136400.52	1019.00		FLOOR
110	535792.68	136484.25	1019.00		FLOOR
111	535805.18	136563.89	1018.50		FLOOR
112	535829.29	136589.74	1018.00		FLOOR
113	535765.36	136540.79	1018.00		FLOOR
114	535739.72	136534.11	1017.60		FLOOR
115	535722.55	136456.71	1018.00		FLOOR
116	535691.74	136434.23	1018.63		FLOOR

* AS-BUILT INFORMATION TO BE COMPLETED BY CONTRACTOR AND INCLUDED WITH RECORD DRAWINGS.

- LEGEND**
- 1019 PROPOSED CONTOUR LINE
 - X 1018.2 SPOT ELEVATION
 - CHANGE-IN-GRADE
 - 1 8 DETAIL REFERENCE NUMBER
 - 73 DRAWING REFERENCE NUMBER
 - 73 CONSTRUCTION SURVEY CONTROL POINT (SEE TABLE THIS DRAWING)
 - CENTERLINE OF ANCHOR TRENCH

- NOTES:**
- REFER TO DRAWING NO. 1 FOR ADDITIONAL BASE MAP INFORMATION.
 - PROPOSED GRADES/ELEVATIONS SHOWN WITHIN INBOARD CREST OF BERMS AND EMBANKMENT REPRESENT TOP OF LINER SYSTEM. ALL OTHER PROPOSED GRADES/ELEVATIONS REPRESENT FINAL GRADE.
 - NEW INTERIOR BERM SHALL BE CONSTRUCTED WITH A VALLEY TO ALLOW FOR PLACEMENT OF THE LEACHATE COLLECTION PIPE ABOVE THE BASE LINER SYSTEM. LOW PERMEABILITY SOIL WILL BE PLACED WITHIN THE BERM VALLEY AS SHOWN.
 - CONTRACTOR SHALL INSTALL NEW 6" HDPE LEACHATE COLLECTION PIPE (WITH END CAP) IN A MANNER THAT WILL ALLOW THE NEW AND EXISTING PIPES TO BE CONNECTED (VIA ELECTROFUSION) IN THE FUTURE. CONTRACTOR SHOULD NOTE THAT REMOVING SOIL MATERIALS MAY BE NECESSARY TO EXPOSE THE EXISTING PIPE AND END CAPS. THE CONTRACTOR SHALL CLEAR MATERIALS, AS NECESSARY, AND RESTORE TO PRE-CONSTRUCTION CONDITIONS FOLLOWING THE COMPLETION OF WORK.
 - EXISTING INTERIOR BERM CONFIGURATION IS APPROXIMATE ONLY. CONTRACTOR SHALL EXPOSE EXISTING GEOSYNTHETICS USING EXTREME CARE. ANY DAMAGE TO THE GEOSYNTHETICS CAUSED BY THE CONTRACTOR TO BE REPAIRED IMMEDIATELY ENTIRELY AT THE CONTRACTORS EXPENSE.
 - CONTRACTOR SHALL VERIFY SUBGRADE/LINER SYSTEM/LEACHATE COLLECTION PIPE TIE-IN CONDITIONS ARE IN ACCORDANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS PRIOR TO THEIR CONSTRUCTION. DISCREPANCIES IDENTIFIED BY THE CONTRACTOR SHALL BE BROUGHT TO THE ATTENTION OF GE.
 - SURVEY TOLERANCE IS $\pm 0.05'$ UNLESS OTHERWISE APPROVED BY GE OR GE'S REPRESENTATIVE.
 - REFER TO DRAWING NO. 5 FOR ADDITIONAL CONSTRUCTION INFORMATION.

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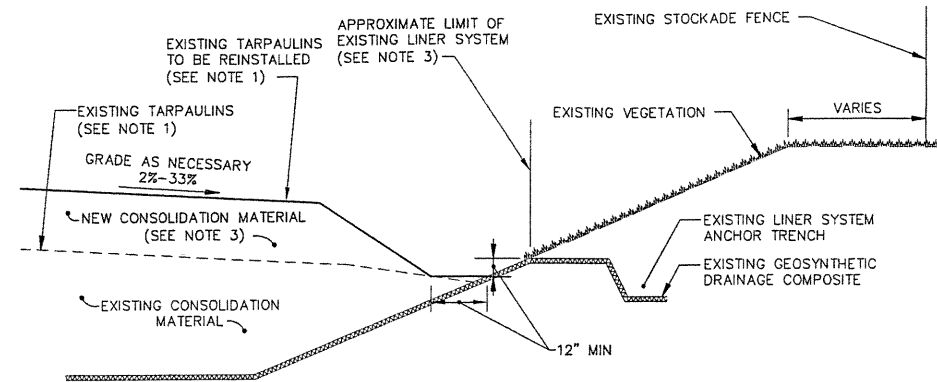
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GENERAL ELECTRIC COMPANY • PITTSFIELD, MASSACHUSETTS
2002 OPCA CONSTRUCTION AND CONSOLIDATION ACTIVITIES
BUILDING 71 OPCA TOP OF LINER AND LEACHATE COLLECTION SYSTEM PLAN
GENERAL

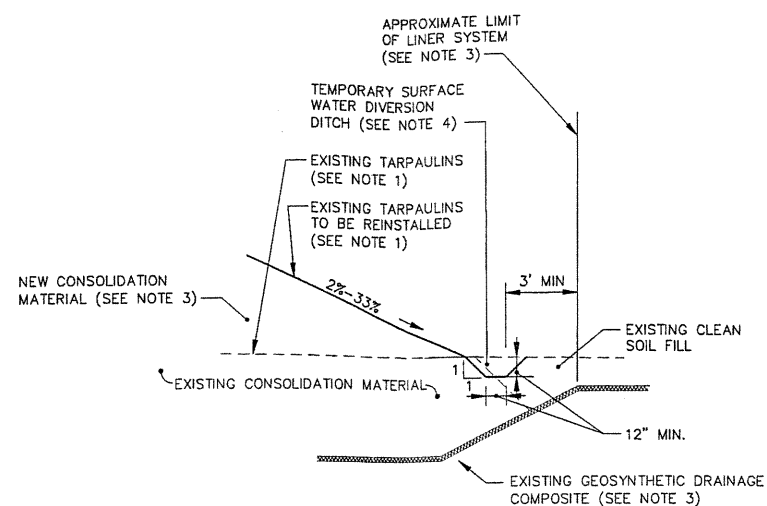
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TYPICAL PERIMETER EMBANKMENT SECTION

BUILDING 71 OPCA ①

NOT TO SCALE



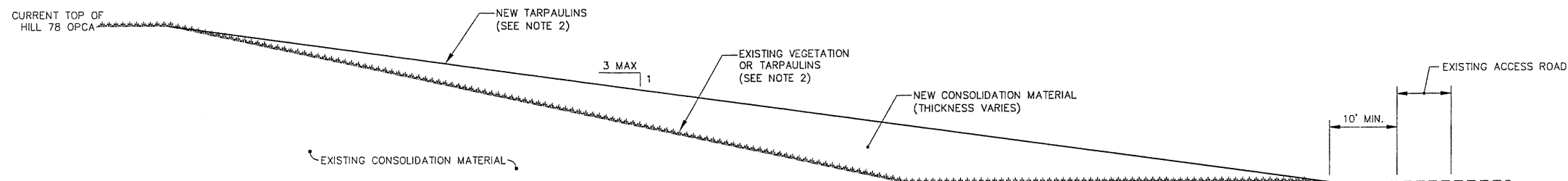
TYPICAL PERIMETER BERM SECTION

BUILDING 71 OPCA ②

NOT TO SCALE

NOTES:

1. CONTRACTOR SHALL REMOVE EXISTING TARPULINS FROM BUILDING 71 OPCA IMMEDIATELY PRIOR TO PLACING CONSOLIDATION MATERIAL. CONTRACTOR SHALL REINSTALL EXISTING TARPULINS AT THE END OF EACH WORK DAY, BEFORE RAIN EVENTS, AND IMMEDIATELY FOLLOWING COMPLETION OF CONSOLIDATION MATERIAL PLACEMENT. TARPULINS SHALL BE PROPERLY ANCHORED TO RESIST WIND FORCES AND PREVENT STORMWATER FROM CONTACTING CONSOLIDATION MATERIAL. UPGRADIENT EDGES OF BUILDING 71 OPCA TARPULINS SHALL BE KEYED A MINIMUM OF 6" INTO THE EXISTING EMBANKMENT. SEE DRAWING NO. 4 FOR ADDITIONAL INFORMATION.
2. CONTRACTOR SHALL REMOVE EXISTING TARPULINS FROM HILL 78 OPCA IMMEDIATELY PRIOR TO PLACING CONSOLIDATION MATERIAL. CONTRACTOR SHALL REINSTALL TARPULINS AT THE END OF EACH WORK DAY, BEFORE RAIN EVENTS, AND IMMEDIATELY FOLLOWING COMPLETION OF CONSOLIDATION MATERIAL PLACEMENT. TARPULINS SHALL BE PROPERLY ANCHORED TO RESIST WIND FORCES AND PREVENT STORMWATER FROM CONTACTING NEW CONSOLIDATION MATERIAL.
3. REFER TO DRAWING NO. 4 FOR APPROXIMATE LIMITS OF BUILDING 71 OPCA LINER SYSTEM. CONTRACTOR SHALL NOT DAMAGE THE EXISTING BUILDING 71 OPCA LINER SYSTEM DURING PLACEMENT OF CONSOLIDATION MATERIALS. ANY DAMAGE TO THE LINER SYSTEM AS A RESULT OF THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF GE.
4. CONTRACTOR SHALL EXCAVATE A TEMPORARY SURFACE WATER DIVERSION DITCH AT THE PERIMETER OF THE BUILDING 71 OPCA PRIOR TO PLACING NEW CONSOLIDATION MATERIALS TO PREVENT STORMWATER RUNOFF FROM MIGRATING BEYOND THE LIMITS OF THE LINER SYSTEM. CONTRACTOR SHALL BACKFILL TEMPORARY SURFACE WATER DIVERSION DITCH FOLLOWING COMPLETION OF EACH CONSOLIDATION MATERIAL PLACEMENT EVENT. SEE DRAWING NO. 4 FOR ADDITIONAL INFORMATION.



TYPICAL SLOPE SECTION

HILL 78 OPCA ③

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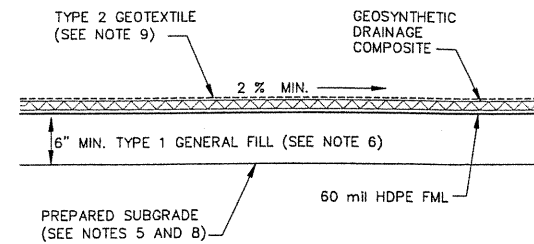
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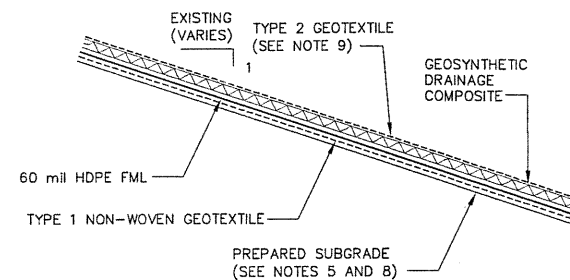
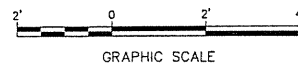
MATERIAL CONSOLIDATION SECTIONS

GENERAL

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BASE LINER SYSTEM 1

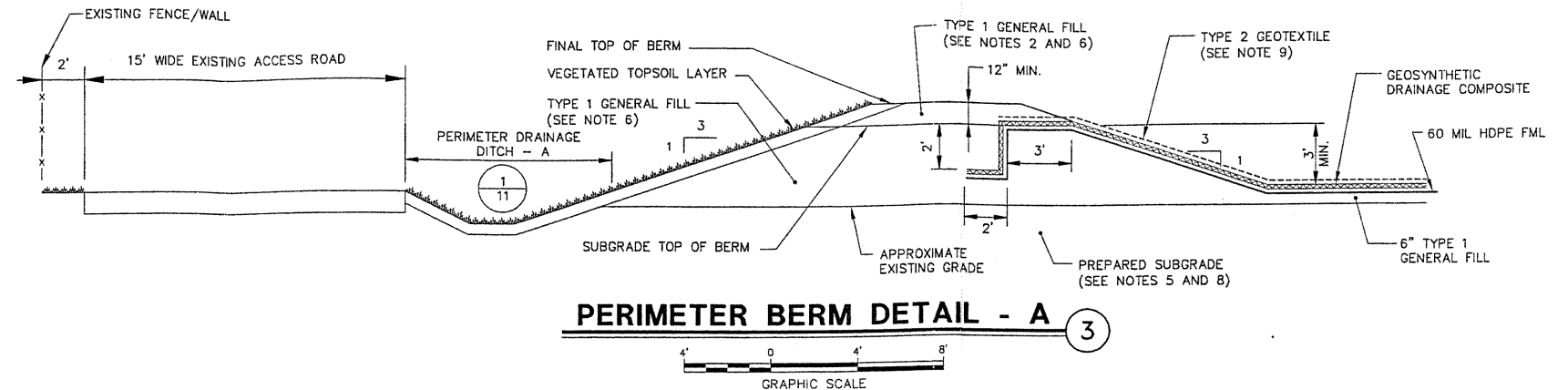


EMBANKMENT LINER SYSTEM 2

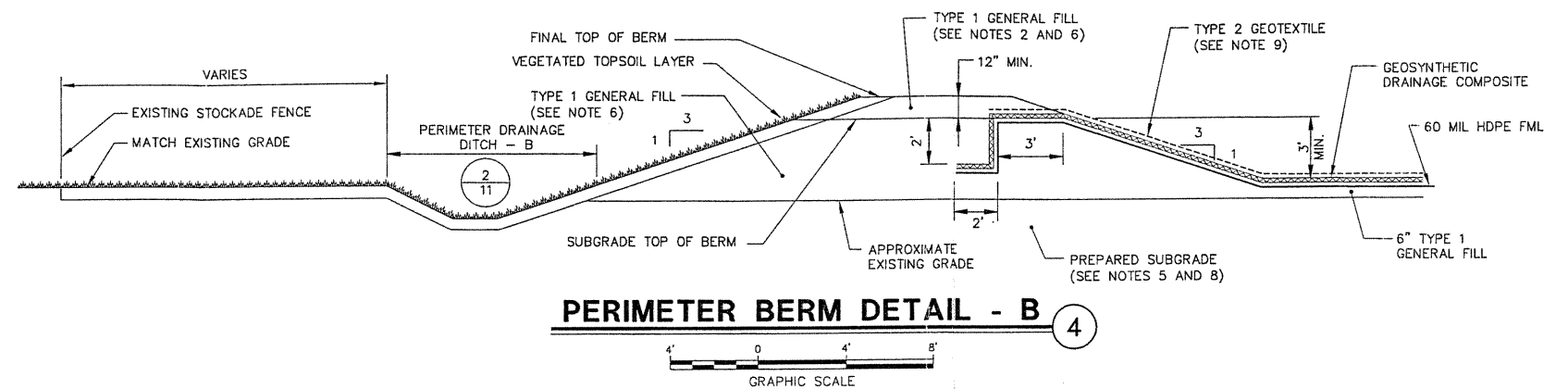
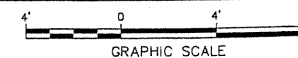
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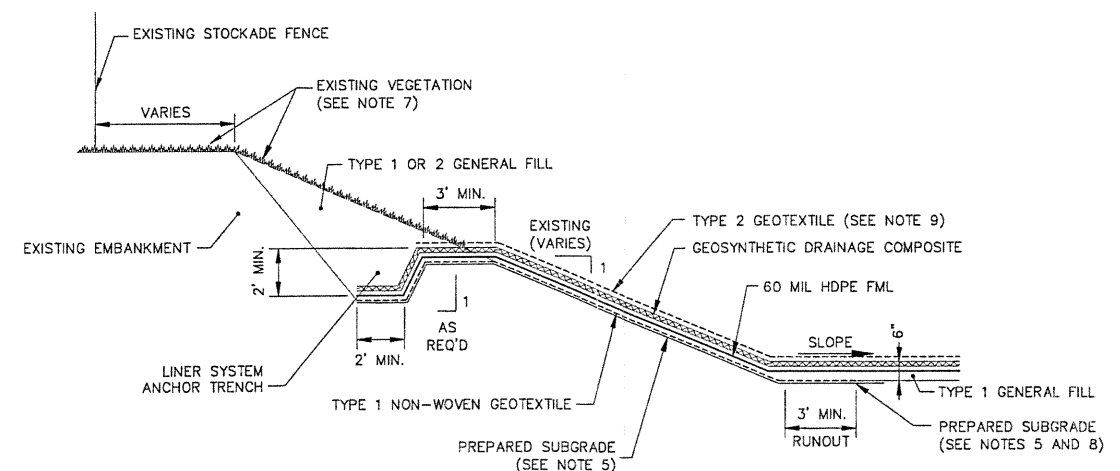
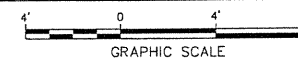
1. GEOSYNTHETIC MATERIALS ARE SHOWN AT AN EXAGGERATED SCALE FOR CLARITY.
2. A MINIMUM OF 12-INCHES OF TYPE 1 GENERAL FILL MUST BE PLACED ABOVE ANCHOR TRENCH RUNOUT.
3. EXISTING CHAIN LINK FENCE TO BE REMOVED WHERE NECESSARY TO FACILITATE CONSTRUCTION OF LINER SYSTEM AND DISPOSED OF IN ACCORDANCE WITH THE PROJECT REQUIREMENTS.
4. CONTRACTOR SHALL REMOVE EXISTING MULCH/WOOD CHIPS IN AREA DESIGNATED FOR LINER AND BERM CONSTRUCTION. REMOVED MATERIAL SHALL BE DISPOSED OF IN ACCORDANCE WITH THE PROJECT REQUIREMENTS.
5. AREAS DESIGNATED FOR LINER AND BERM CONSTRUCTION SHALL BE CLEARED OF ALL DELETERIOUS MATERIAL (I.E. VEGETATION, STONES, CONCRETE, PIPES, MANHOLES, ETC.), PROOF-ROLLED AND REGRADED AND/OR FILLED AS NECESSARY WITH TYPE 1 GENERAL FILL, TO PROVIDE A FIRM, UNIFORM SOIL SURFACE FREE FROM PROTRUDING OBJECTS. PROOF-ROLLING SHALL BE PERFORMED IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
6. TYPE 1 GENERAL FILL USED FOR SUBBASE LAYER AND BERM CONSTRUCTION SHALL PROVIDE A FIRM, UNIFORM SOIL SURFACE FREE FROM PROTRUDING OBJECTS.
7. EXISTING VEGETATION DISTURBED/REMOVED AS A RESULT OF CONSTRUCTION ACTIVITIES SHALL BE REPLACED IMMEDIATELY FOLLOWING COMPLETION OF FINAL GRADING.
8. EXISTING SUBGRADE TO BE REGRADED AND/OR FILLED AS NECESSARY TO ACHIEVE THE PROPOSED LINES AND GRADES SHOWN ON DRAWING NO. 5.
9. TYPE 2 GEOTEXTILE SHALL BE PLACED, SEWN, AND PROPERLY ANCHORED (E.G., SANDBAGS, RUBBER TIRES) TO RESIST WIND FORCES AND PREVENT ANY PORTION OF THE GEOSYNTHETIC DRAINAGE COMPOSITE FROM BEING EXPOSED TO ULTRAVIOLET RAYS.
10. HAY BALES SHALL BE STAKED ACROSS THE WIDTH OF THE NEW AND EXISTING PERIMETER DITCHES AT 50-FOOT INTERVALS.



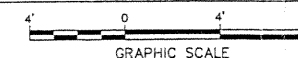
PERIMETER BERM DETAIL - A 3



PERIMETER BERM DETAIL - B 4



TYPICAL LINER SYSTEM/EMBANKMENT DETAIL 5



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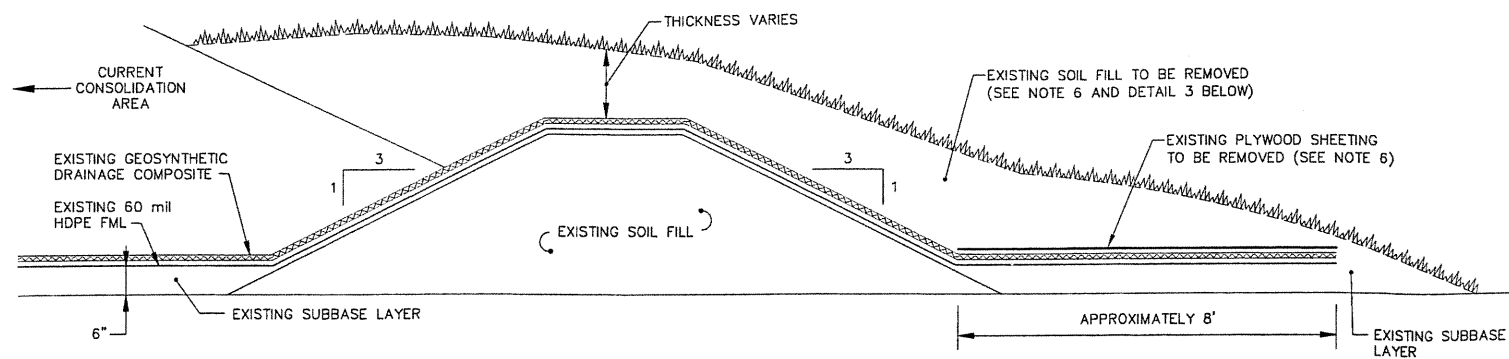
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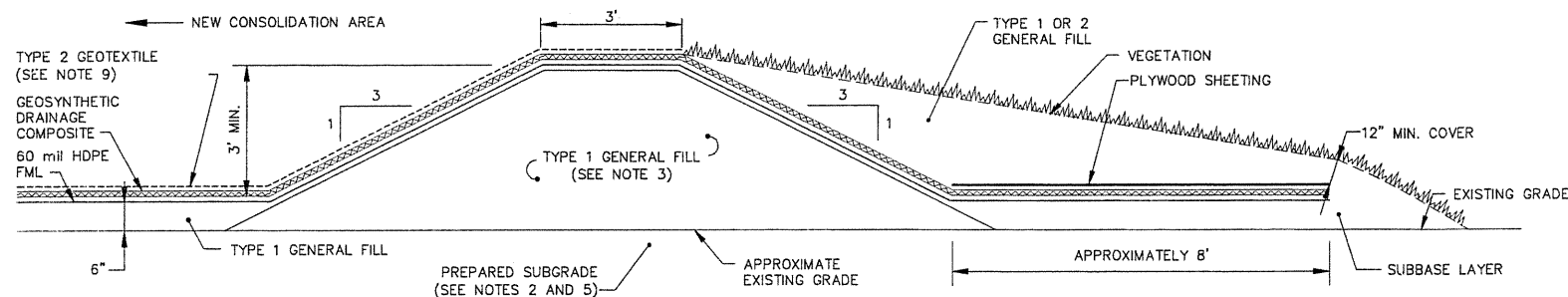
LINER SYSTEM DETAILS

GENERAL

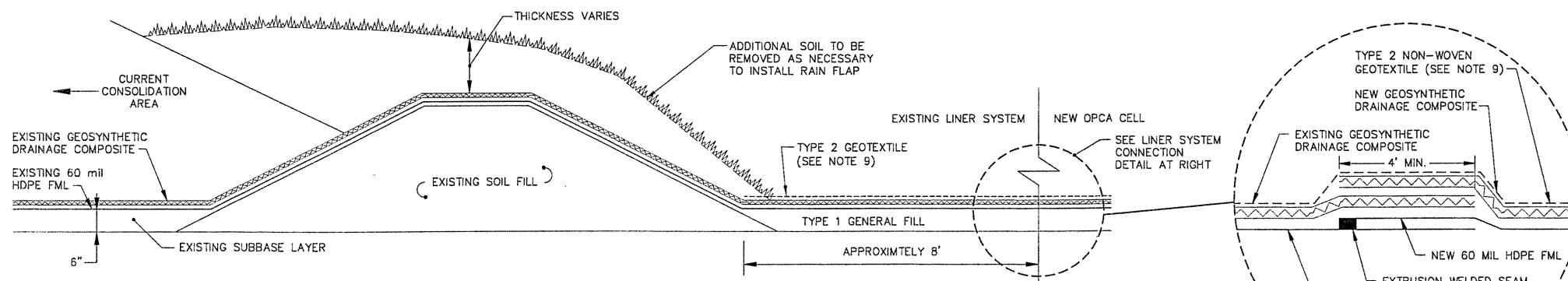
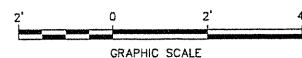
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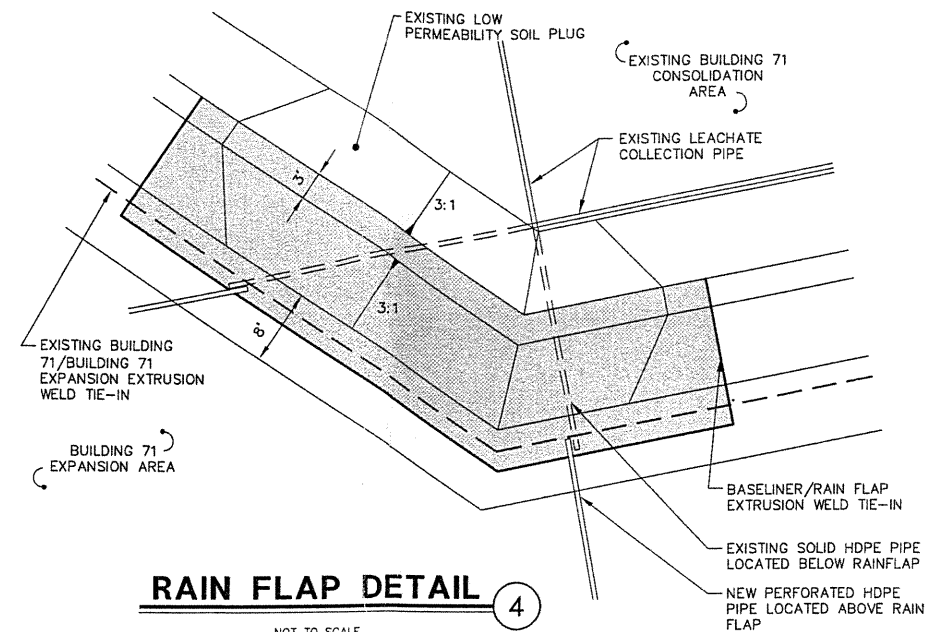
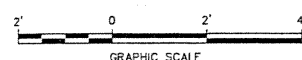
EXISTING INTERIOR BERM DETAIL 1



NEW INTERIOR BERM DETAIL 2



EXISTING INTERIOR BERM CONNECTION DETAIL 3



NOTES:

1. CONTRACTOR SHALL PLACE A CONTINUOUS ROW OF SANDBAGS AT THE TOP OF SLOPE AND TOE OF SLOPE IN AREA OF RAIN FLAP INSTALLATION.
2. GEOSYNTHETIC DRAINAGE COMPOSITE SHALL BE CUT AS NECESSARY TO WELD RAIN FLAP TO BASELINER.
3. CONTRACTOR SHALL PROVIDE A MINIMUM OF 2000 SF OF ADDITIONAL GEOSYNTHETIC DRAINAGE COMPOSITE FOR FUTURE USE DURING RAIN FLAP REMOVAL.

GENERAL NOTES:

1. GEOSYNTHETIC MATERIALS ARE SHOWN AT AN EXAGGERATED SCALE FOR CLARITY.
2. AREAS DESIGNATED FOR LINER AND BERM CONSTRUCTION SHALL BE CLEARED OF ALL DELETERIOUS MATERIAL (I.E. VEGETATION, STONES, CONCRETE, PIPES, MANHOLES, ETC.) AND REGRADED AND/OR FILLED AS NECESSARY WITH TYPE 1 GENERAL FILL, TO PROVIDE A FIRM, UNIFORM SOIL SURFACE FREE FROM PROTRUDING OBJECTS.
3. TYPE 1 GENERAL FILL USED FOR SUBBASE LAYER AND BERM CONSTRUCTION SHALL PROVIDE A FIRM, UNIFORM SOIL SURFACE FREE FROM STONES OR OTHER PROTRUDING OBJECTS.
4. EXISTING VEGETATION DISTURBED/REMOVED AS A RESULT OF CONSTRUCTION ACTIVITIES SHALL BE REPLACED IMMEDIATELY FOLLOWING COMPLETION OF FINAL GRADING, UNLESS GE DIRECTS OTHERWISE.
5. EXISTING SUBGRADE TO BE REGRADED AND/OR FILLED AS NECESSARY, TO ACHIEVE THE PROPOSED LINES AND GRADES SHOWN ON DRAWING NO. 5.
6. EXISTING SOIL FILL, VEGETATION AND PLYWOOD SHEETING SHALL BE REMOVED FROM EXISTING INTERIOR BERM PRIOR TO THE CONNECTION OF THE NEW AND THE EXISTING LINER SYSTEMS. MATERIAL ABOVE GEOSYNTHETICS SHALL BE CAREFULLY REMOVED USING ROUNDED PLASTIC HANDTOOLS AS NECESSARY TO AVOID DAMAGE TO UNDERLYING GEOSYNTHETICS.
7. NEW GEOSYNTHETIC DRAINAGE COMPOSITE SHALL OVERLAP THE EXISTING GEOSYNTHETIC DRAINAGE COMPOSITE A MINIMUM OF 4 FEET AND BE TIED APPROXIMATELY EVERY 6 INCHES ACROSS THE WIDTH OF THE CELL.
8. NEW 60 MIL HDPE FML SHALL OVERLAP THE EXISTING 60 MIL. MIL HDPE FML A MINIMUM OF 4 FEET AND EXTRUSION WELDED.
9. TYPE 2 GEOTEXTILE SHALL BE PLACED, SEWN, AND PROPERLY ANCHORED (E.G., SANDBAGS, RUBBER TIRES) TO RESIST WIND FORCES AND PREVENT ANY PORTION OF THE GEOSYNTHETIC DRAINAGE COMPOSITE FROM BEING EXPOSED TO ULTRAVIOLET RAYS.

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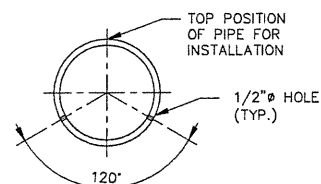
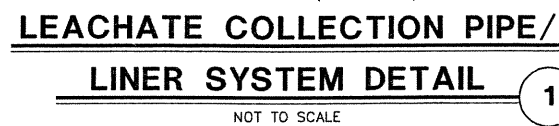
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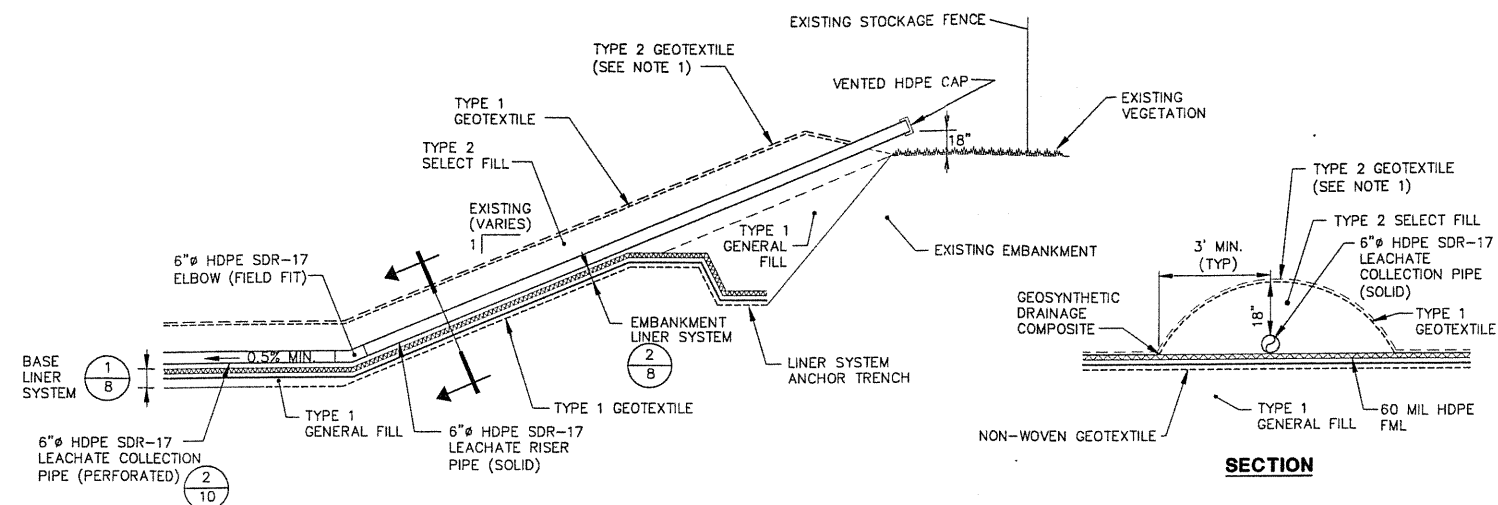
LINER SYSTEM DETAILS

GENERAL

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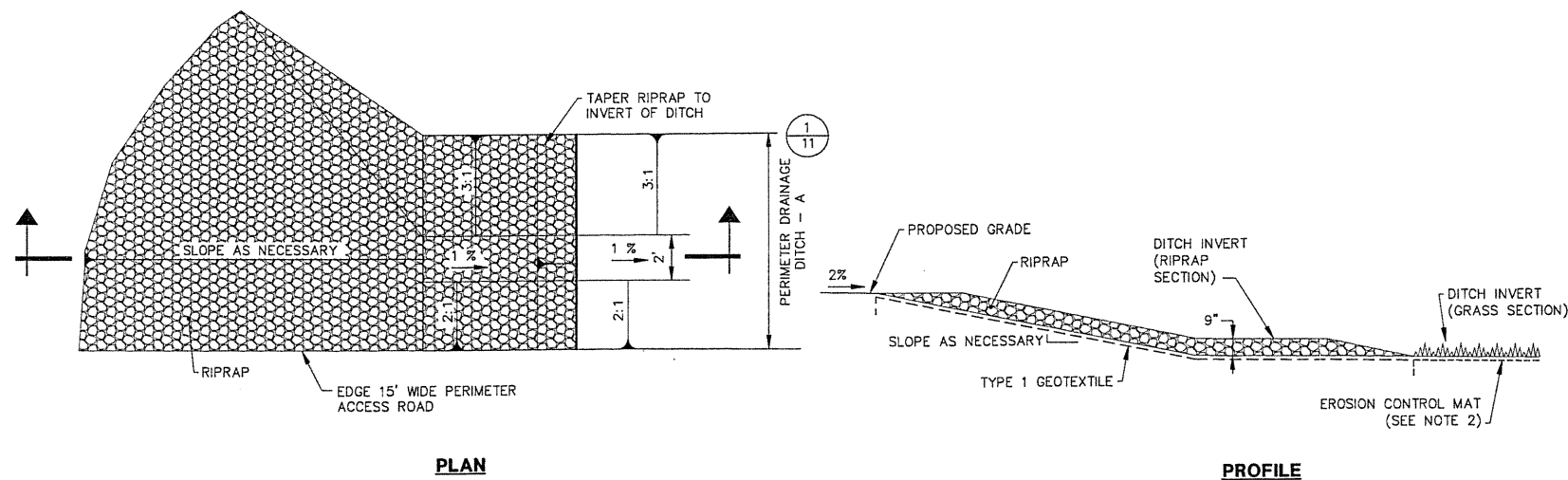
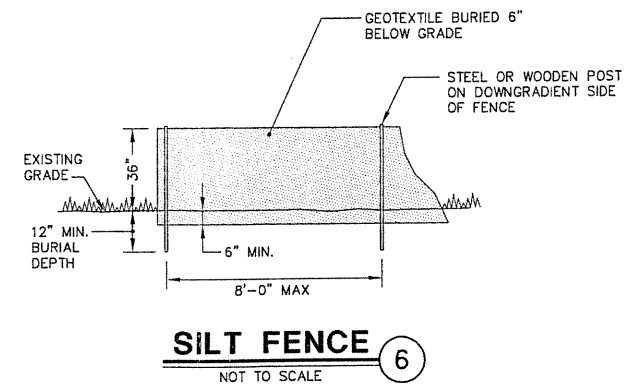
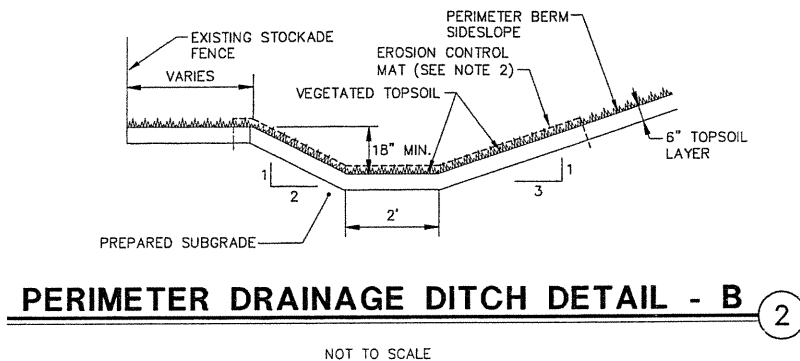
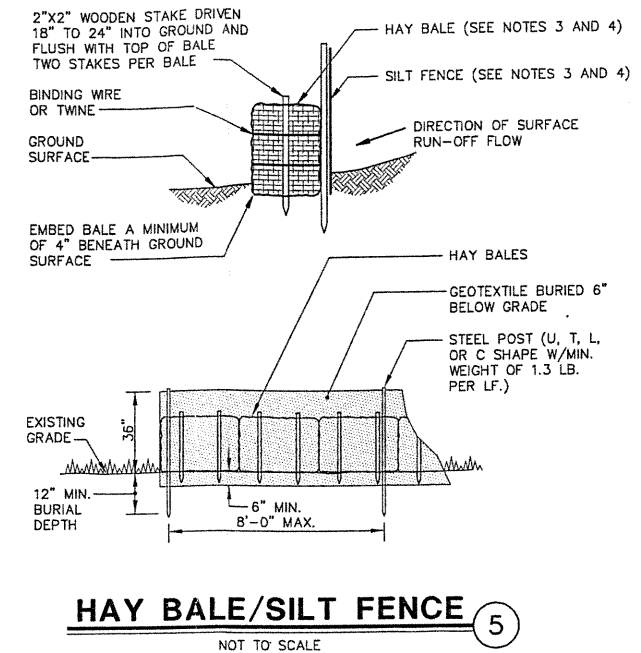
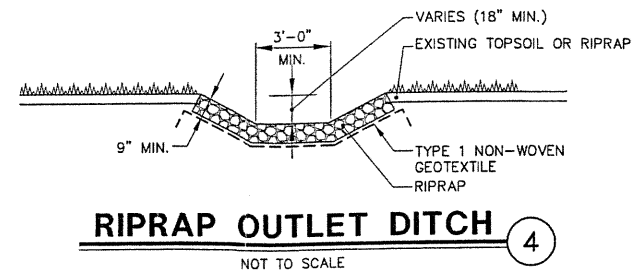
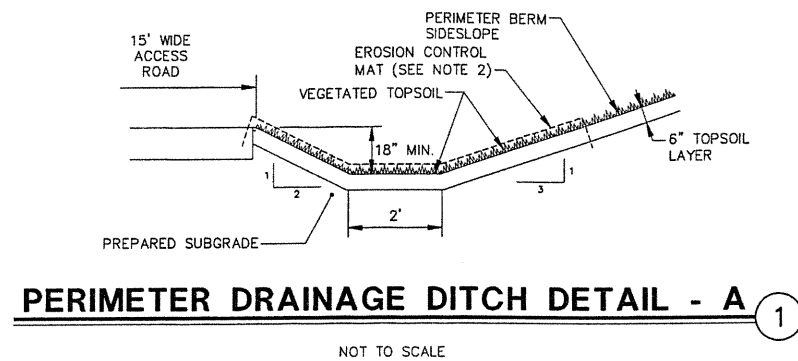


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1. TYPE 2 GEOTEXTILE SHALL BE PLACED, SEWN, AND PROPERLY ANCHORED (E.G., SANDBAGS, RUBBER TIRES) TO RESIST WIND FORCES AND PREVENT ANY PORTION OF THE GEOSYNTHETIC DRAINAGE COMPOSITE FROM BEING EXPOSED TO ULTRAVIOLET RAYS.
2. LEACHATE COLLECTION PIPE LOCATED WITHIN LOW PERMEABILITY SOIL PLUG AND ALONG EMBANKMENT (RISER PIPE), SHALL BE 6"Ø HDPE SDR-17 SOLID PIPE.



NOTES:

1. RIPRAP WITHIN DITCH TRANSITION LENGTH SHALL BE SORTED AND GRADED TO PROVIDE FOR MAXIMUM FLOW DISTRIBUTION AND VELOCITY DISSIPATION.
2. EROSION CONTROL MAT SHALL BE NORTH AMERICAN GREEN SC150 OR EQUAL INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
3. HAY BALES AND SILT FENCING WILL BE REMOVED BY THE CONTRACTOR WHEN REQUESTED BY GE.
4. THE CONTRACTOR SHALL MAINTAIN THE INTEGRITY OF THE HAY BALES/SILT FENCING AS LONG AS THEY ARE NECESSARY.

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EROSION CONTROL AND DRAINAGE DETAILS

GENERAL

File Number
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Date
MARCH 2002

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315-446-9120

Attachment 2

Project Change Order Request (Not Included)

Attachment 3

Daily Construction Activities Report (Not Included)

Attachment 4

General Electric Company - Guidelines for Cleaning Incidentally PCB- Contaminated Equipment for Sale, Reuse, or Scrapping (Not Included)

Attachment 5

Technical Submittal Register

**General Electric Company
Pittsfield, Massachusetts**

2002 OPCA Construction and Consolidation Activities

Technical Submittal Register

Item No.	Submittal Description	Specification Reference (see Note 2)	Date Submitted	Review Conducted by:		Interim Status (see Note 1.)	Final Status (see Note 1.)	Date Approved	Notes
				GE Project Manager	Design Engineer				
1	Operations Plan - The Plan shall address, but not be limited to the following items:	Section 3.4							
	• List of Equipment to be used on-site.	Section 3.4		X	X				
	• Procedures for the safety, security, and protection of all adjacent properties (i.e., General Dynamics parking lot, and the Pittsfield Generating Company facility).	Section 3.4		X	X				
	• The Contractor's proposed plan for controlling vehicular and pedestrian traffic while performing construction and operational activities (refer to Section 3.14 of the RFP).	Section 3.4		X	X				
	• The Contractor's qualifications package.	Section 3.4		X	X				
	• Stormwater (including run-on and run-off), erosion, noise, and dust control measures.	Section 3.4		X	X				
	• Equipment cleaning procedures (refer to Section 3.27 of the RFP).	Section 3.4		X	X				
	• The Contractor's proposed approach for installing the base liner system.	Section 3.4		X	X				
	• The Contractor's proposed approach for installing and compacting materials within the consolidation areas, as well as equipment to be used.	Section 3.4/Materials and Performance - Section 02200; Earthwork (1.03)(A)		X	X				
2	Health and Safety Plan - The Plan shall address, but not be limited to the following items (see Note 3):	Section 3.5							
	• Identification of Key Personnel - Identify by name and by title, the on-site and off-site health and safety personnel responsible for the implementation of health and safety procedures. All on-site personnel involved in the measures must have OSHA 40-hour Hazardous Waste Training (29 CFR 1910.120 and 1926.65) and the corresponding 8-hour refresher course update.	Section 3.5		X	X				
	• Training - Describe and provide certification of all supervisory and on-site personnel having received appropriate health and safety training. Training requirements shall also include attending an initial site orientation prior to engaging in any on-site activities. Sign-off sheets acknowledging attendance shall be provided.	Section 3.5		X	X				
	• Medical Surveillance - Certify that all supervisory and on-site personnel have received appropriate medical examinations and are able to conduct the tasks required for this project including, but not limited to, working with chemicals, using respiratory protection, using personal protective equipment, and conducting hazardous waste operations in accordance with 29 CFR 1910.120 and 1926.65.	Section 3.5		X	X				
	• Task-Specific Hazard/Risk Analysis - Identify and provide a means of mitigating all foreseeable biological, chemical, and physical hazards associated with the work, including, but not limited to, hazards associated with exposure to constituents of concern, heavy equipment operation, site conditions, weather, biological hazards, materials handling, and work around excavated areas.	Section 3.5		X	X				

Attachment 5

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General Electric Company
Pittsfield, Massachusetts

2002 OPCA Construction and Consolidation Activities

Technical Submittal Register

Item No.	Submittal Description	Specification Reference (see Note 2)	Date Submitted	Review Conducted by:		Interim Status (see Note 1.)	Final Status (see Note 1.)	Date Approved	Notes
				GE Project Manager	Design Engineer				
	• Work Zones - Provide a site plan which depicts the designation of zones including: (1) Exclusion Zones (2) Decontamination Zones, and (3) Support Zones. The level of personal protection for each zone must be included.	Section 3.5		X	X				
	• Personal Safety Equipment and Protective Clothing - Identify personal safety equipment and protective clothing to be used and available on-site. This shall include identification of expected levels of protection (A, B, C, D) for each task, and the action levels for personal protective equipment upgrades. A respiratory protection program that meets the requirements of 29 CFR 1910.134, and which establishes specific requirements for any respirator use shall be included.	Section 3.5		X	X				
	• Personal Air Monitoring - Identify protocols and criteria associated with personal air monitoring of on-site personnel.	Section 3.5		X	X				
	• Equipment Decontamination - Describe methods and procedures to be used for personnel, vehicle, and equipment decontamination.	Section 3.5		X	X				
	• Material Safety Data Sheets - Provide Material Safety Data Sheets (MSDSs) for all materials to be brought on site, as well as constituents which are expected to be encountered in the course of the construction activities.	Section 3.5		X	X				
	• Construction Safety Procedures (OSHA 1926.1 - 1926.652, Subpart A-P) to address excavation and trenching safety procedures, as well as daily site safety inspection checklist to evaluate these items.	Section 3.5		X	X				
	• Standard Operating Procedures and Safety Programs as required by applicable sections of 29 CFR 1910 and 1926.	Section 3.5		X	X				
3	Contingency Plan - The Plan shall address, but not be limited to the following items:	Section 3.6							
	• Spill prevention control and countermeasures plan for all materials brought on site.	Section 3.6		X	X				
	• Emergency vehicular access/egress.	Section 3.6		X	X				
	• Procedures for evacuating personnel from the work site.	Section 3.6		X	X				
	• List of all contact personnel with phone numbers to include: GE; the Contractor; the City of Pittsfield; fire officials; ambulance service; local, county, and state police; and local hospitals, including routes to local hospitals and procedures for notifying each.	Section 3.6		X	X				
	• Identification of responsible personnel who will be in a position at all times to receive incoming phone calls and to dispatch Contractor personnel and equipment in the event of an emergency situation. The telephone number(s) must be supplied to GE not less than five days prior to commencing the work.	Section 3.6		X	X				
4	Work Schedule	Section 3.7		X	X				
5	Name, location, and quantity of each source and type of fill material proposed by the Contractor, including provision of a sample from each source and soil fill type (refer to Section 3.28 of the RFP).	Section 3.2		X	X				

**General Electric Company
Pittsfield, Massachusetts**

2002 OPCA Construction and Consolidation Activities

Technical Submittal Register

Item No.	Submittal Description	Specification Reference (see Note 2)	Date Submitted	Review Conducted by:		Interim Status (see Note 1.)	Final Status (see Note 1.)	Date Approved	Notes
				GE Project Manager	Design Engineer				
6	Name of subcontractor(s) to be used	Section 3.2		X	X				
7	Record Drawings (refer to Section 3.32 of the RFP)	Section 3.2		X	X				
8	All sample and analytical results, including all laboratory deliverables (e.g., wipe samples)	Section 3.2		X	X				
9	Restoration of Surfaces - A schedule of restoration operations.	Materials and Performance - Section 02207 (1.03)(A)			X				
10	Topsoil, Seeding and Mulch - Analysis of the seed and fertilizer, and proposed application rates.	Materials and Performance - Section 02212 (1.03)(A)			X				
11	Topsoil, Seeding and Mulch - Should hydroseed be used, the Contractor shall submit all data including material and application rates.	Materials and Performance - Section 02212 (1.03)(B)			X				
12	Topsoil, Seeding and Mulch - Location of source, and pH and organic content testing of off-site topsoil (if required).	Materials and Performance - Section 02212 (1.03)(C)			X				
13	Topsoil, Seeding and Mulch - Sample of topsoil to be tested by GE for chemical contaminants as discussed in Section 3.28 of the RFP.	Materials and Performance - Section 02212 (1.03)(D)			X				
14	Geosynthetic Drainage Composite - Manufacturer's data for the geosynthetic drainage composite including physical properties and roll size.	Materials and Performance - Section 02219 (1.04)(A1)			X				
15	Geosynthetic Drainage Composite - Geosynthetic drainage composite material sample.	Materials and Performance - Section 02219 (1.04)(A2)			X				
16	Geosynthetic Drainage Composite - Manufacturer's quality assurance/quality control program.	Materials and Performance - Section 02219 (1.04)(A3)			X				
17	Geosynthetic Drainage Composite - Certified results of all quality control testing. The results must identify the sections of field delivered geosynthetic drainage composite they represent. Contractor shall submit written certification that the field-delivered material meets the manufacturer's specifications. The Contractor shall also provide the lot and roll number for the material delivered to the site.	Materials and Performance - Section 02219 (1.04)(A4)/(2.04)(A)			X				
18	Geosynthetic Drainage Composite - Contractor's proposed transportation, handling, and storage techniques.	Materials and Performance - Section 02219 (1.04)(A5)			X				
19	Geosynthetic Drainage Composite - Shop drawings for indicating panel layouts and installation sequence.	Materials and Performance - Section 02219 (1.04)(A6)			X				
20	Geotextile Fabric - Manufacturer's data for geotextile including, at a minimum, physical properties, packaging, and installation techniques.	Materials and Performance - Section 02232 (1.03)(A)			X				
21	Geotextile Fabric - Manufacturer's quality assurance/quality control program.	Materials and Performance - Section 02232 (1.03)(B)			X				
22	Geotextile Fabric - Certified results of all quality control testing. The results shall identify the sections/panels of field-delivered fabric they represent. The Contractor shall submit written certification that the field delivered material meets the manufacturer's specifications. The Contractor shall also provide the lot and roll number for the fabric delivered to the site.	Materials and Performance - Section 02232 (1.03)(C)/(2.04)(A)			X				
23	Geotextile Fabric - Contractor's proposed transportation, handling, storage, and installation techniques.	Materials and Performance - Section 02232 (1.03)(D)			X				
24	Geotextile Fabric - Shop drawings, including panel layouts and installation sequence.	Materials and Performance - Section 02232 (1.03)(E)			X				

Attachment 5

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General Electric Company
Pittsfield, Massachusetts

2002 OPCA Construction and Consolidation Activities

Technical Submittal Register

Item No.	Submittal Description	Specification Reference (see Note 2)	Date Submitted	Review Conducted by:		Interim Status (see Note 1.)	Final Status (see Note 1.)	Date Approved	Notes
				GE Project Manager	Design Engineer				
25	Geotextile Fabric - Manufacturer's standard warranty provided for geotextiles.	Materials and Performance - Section 02232 (1.03)(F)			X				
26	Geotextile Fabric - Upon completion, the Contractor shall submit all quality control documentation and the as-built drawings.	Materials and Performance - Section 02232 (3.03)(A1)			X				
27	Geotextile Fabric - Upon completion, the Contractor shall submit the warranty obtained from the Manufacturer/Fabricator.	Materials and Performance - Section 02232 (3.03)(A2)			X				
28	Silt Fencing - Manufacturer's data for geotextile including, at a minimum, physical properties, and packaging.	Materials and Performance - Section 02233 (1.03)(A)			X				
29	Silt Fencing - Manufacturer's quality assurance/quality control program.	Materials and Performance - Section 02233 (1.03)(B)			X				
30	Silt Fencing - Certified results of all quality control testing. The results shall identify the sections/panels of field-delivered fabric they represent.	Materials and Performance - Section 02233 (1.03)(C)			X				
31	Silt Fencing - The Contractor shall submit written certification that the field delivered fabric meets the manufacturer's specifications. The Contractor shall also provide the lot and roll number for the material delivered to the site.	Materials and Performance - Section 02233 (2.04)(A)			X				
32	Silt Fencing - The Contractor shall obtain from the manufacturer and submit to GE or GE's Representative, a standard warranty provided for the geotextiles.	Materials and Performance - Section 02233 (3.02)(A)			X				
33	Flexible Membrane Liner - FML Manufacturer's corporate background and information.	Materials and Performance - Section 02234 (1.04)(A1.a)			X				
34	Flexible Membrane Liner - Manufacturing capabilities including: quality control procedures for manufacturing, and list of material properties including certified test results, to which FML samples are attached.	Materials and Performance - Section 02234 (1.04)(A1.b)			X				
35	Flexible Membrane Liner - A list of at least 10 completed facilities, totaling a minimum of 10,000,000 ft ² , for which the Manufacturer has manufactured FMLs. For each facility, the following information shall be provided: Name and purpose of facility, its location, and date of installation; Name of Owner, Project Manager, Designer, Fabricator (if any), and installer; and Thickness and surface area of FML manufactured.	Materials and Performance - Section 02234 (1.04)(A1.c)			X				
36	Flexible Membrane Liner - Origin (resin supplier's name, resin production plant) and identification (brand name, number) of the resin.	Materials and Performance - Section 02234 (1.04)(A1.d)			X				
37	Flexible Membrane Liner - Copy of FML Installer's letter of approval or license by the Manufacturer.	Materials and Performance - Section 02234 (1.04)(B2.a)			X				
38	Flexible Membrane Liner - Resume of the "master seamer" to be assigned to this project, including dates and duration of employment.	Materials and Performance - Section 02234 (1.04)(B2.b)			X				

**General Electric Company
Pittsfield, Massachusetts**

2002 OPCA Construction and Consolidation Activities

Technical Submittal Register

Item No.	Submittal Description	Specification Reference (see Note 2)	Date Submitted	Review Conducted by:		Interim Status (see Note 1.)	Final Status (see Note 1.)	Date Approved	Notes
				GE Project Manager	Design Engineer				
39	Flexible Membrane Liner - Shop drawings, including the following: Layout plan; Quality control program manuals covering all phases of manufacturing and installation; and complete and detailed written instructions for the storage, handling, installation, seaming, inspection plan fail criteria for liner inspections, and QA/QC testing procedures of the liner in compliance with these specifications and the condition of its warranty.	Materials and Performance - Section 02234 (2.04)(A1)			X				
40	Flexible Membrane Liner - FML installers' written certification that the final surface on which the FML is to be installed is acceptable.	Materials and Performance - Section 02234 (3.01)(D)			X				
41	Flexible Membrane Liner - Upon completion, the Contractor shall submit record drawings illustrating the following information: Dimensions of all FML field panels; Panel locations referenced to the Technical Drawings; All field seams and panels with the appropriate number or code; and Location of all patches, repairs, and destructive testing samples.	Materials and Performance - Section 02234 (3.02)(A)			X				
42	Flexible Membrane Liner - The Contractor shall obtain and submit to GE or GE's Representative from the Manufacturer a standard warranty provided for the FML.	Materials and Performance - Section 02234 (3.03)(A)			X				
43	Riprap - Particle size distribution of all proposed riprap types.	Materials and Performance - Section 02271 (1.02)(A)			X				
44	Riprap - Proposed sources of riprap and amount of available material at each source.	Materials and Performance - Section 02271 (1.02)(B)			X				
45	High-Density Polyethylene Pipe - The Contractor shall submit to GE or GE's Representative all applicable data demonstrating compliance with the provisions of the Technical Drawings and the Materials and Performance Specifications in accordance with Section 3.2 of the RFP.	Materials and Performance - Section 02526 (1.02)(A)			X				
46	High-Density Polyethylene Pipe - Resumes of certified pipe welders.	Materials and Performance - Section 02526 (1.02)(C)			X				
47	High-Density Polyethylene Pipe - Shop drawings including, but not limited to, the following: Pipe material specifications; Pipe joining techniques and procedures; Pipe and fitting details; and Manufacturer's installation guides.	Materials and Performance - Section 02526 (1.02)(D)			X				

Notes:

1. Submittal status nomenclature is as follows:

- R - Reviewed
- N - Reviewed and noted
- S - Resubmit
- J - Rejected

2. All specifications are referenced to the *Request for Proposal - 2002 OPCA Construction and Consolidation Activities* (BBL, March 2002).

3. The Health and Safety Plan is required for GE record-keeping purposes only and therefore GE and BBL will conduct a review of the plan for completeness only. Determination of the appropriate level of worker safety, equipment, and procedures based on site conditions must be made by the Contractor based on site visits, review of available information, and anticipated site activities.

Attachment 2

Engineering Calculations

CLIENT: General Electric Company PROJECT: GE Pittsfield, MA
TITLE: Engineering Design Calculations
SUBJECT: OPCA - 2002 Engineering Design Summary

Prepared By: BMS Date: 3-6-02
Reviewed By: PHB Date: 3/14/02
Reviewed By: WAR Date: 3/14/02

Liner System Geocomposite:

The existing liner system in the Building 71 OPCA will be expanded as part of the Building 71 OPCA expansion scheduled for 2002. Design calculations for the "required transmissivity" for the liner system geocomposite in the first phase of the Building 71 OPCA were submitted for Agency review and approval in June 2000. In preparation of the Building 71 OPCA expansion, the previously calculated "required transmissivity" was verified using a more recent design methodology (Giroud's equation) and the floor geometry and size of the Building 71 OPCA expansion.

Based on these new parameters, the "required transmissivity" was slightly increased from $1.5 \times 10^{-3} \text{ m}^2/\text{s}$ to $2.1 \times 10^{-3} \text{ m}^2/\text{s}$. The new "required transmissivity" is presented in the project technical specifications.

Leachate Collection Pipe:

The existing leachate collection pipe (constructed in 1999) will be extended to the west and north as part of the Building 71 OPCA expansion scheduled for 2002. Design calculations for the leachate collection pipe were submitted for Agency review and approval in June 2000. Since these design calculations were based on the estimated peak inflow from the entire Building 71 OPCA footprint (as opposed to only the first phase) and reflect the maximum anticipated soil load on the leachate collection pipe (for the purposes of pipe crushing calculations), no additional design calculations are necessary for the expansion of the leachate collection pipe system in the Building 71 OPCA.

Perimeter Drainage Ditch:

The existing perimeter drainage ditch along the southern edge of the Building 71 OPCA (constructed in 1999) will be extended westward as part of the Building 71 OPCA expansion scheduled for 2002. Stormwater runoff and hydraulic calculations demonstrating the ability of this perimeter ditch to convey the estimated peak discharge from the 10-year, 24-hour storm under final OPCA buildout were submitted for Agency review and approval in June 2000.

In addition, a new perimeter ditch will be constructed along the northern edge of the Building 71 OPCA as part of the 2002 construction activities. This perimeter ditch will be constructed with the same cross sectional geometry as the perimeter ditch constructed in 1999 along the southern edge of the Building 71 OPCA. Since the acreage draining to the northern perimeter ditch under the final OPCA buildout will be less than that draining to the southern perimeter ditch (approximately 1.20 acres versus 1.51 acres) and the times of concentration are not expected to be significantly different, the peak discharge to the northern perimeter ditch will be less. Consequently, additional stormwater calculations are not necessary to support the construction of the northern perimeter ditch.

CLIENT: General Electric Company PROJECT: GE Pittsfield, MA
TITLE: Engineering Design Calculations
SUBJECT: OPCA - 2002 Drainage Evaluation

Prepared By: BMS Date: 3-5-02
Reviewed By: PHS Date: 3/14/02
Reviewed By: LPB Date: 3/14/02

OBJECTIVE:

The 30-inch culvert at Merrill Road is the first off-site drainage structure that runoff from the GE property will flow through as it is conveyed downgradient to the Housatonic River. Because of its proximity to the site, the Merrill Road culvert will be the greatest affected by any increase in off-site peak discharge from the GE property. Consequently, the objective of this evaluation is to compare peak discharges from the OPCAs to the Merrill Road culvert for the pre- and post-OPCA development condition and determine the necessity of a third stormwater basin to attenuate any increase in post-development peak discharge.

REFERENCES:

1. Technical drawing entitled "Existing Site Plan" contained in the report entitled "Detailed Work Plan for On-Plant Consolidation Areas" (the Work Plan), Blasland, Bouck & Lee, Inc. (BBL), June 1999.
2. Figure entitled "Final Configuration of On-Plant Consolidation Areas" contained in the Work Plan, BBL, June 1999.
3. Calculation sheet entitled "OPCA - 1999 Stormwater Basin Design," prepared by BBL and contained in a June 13, 2000 letter from GE to the U.S. Environmental Protection Agency (the June 13, 2000 letter).
4. Calculation sheet entitled "OPCA - 2000 Stormwater Basin Design," prepared by BBL and contained in a June 2, 2000 letter from GE to the United States Environmental Protection Agency (the June 2, 2000 letter).
5. Calculation sheet entitled "OPCA - Stormwater Basin Inlet Pipe Design," prepared by BBL and contained in the June 2, 2000 letter.
6. Technical Release 55 "Urban Hydrology for Small Watersheds", Soil Conservation Service, June 1986.
7. PondPack for Windows, Version 7.5, hydrology modeling program, Haestad Methods, Inc..

ASSUMPTIONS:

1. This analysis assesses the change in peak discharge to the Merrill Road culvert due to OPCA development. As such, other stormwater contributions to the Merrill Road culvert (such as runoff conveyed to the Merrill Road culvert from the upgradient residential areas via the storm sewer trunk crossing GE property) are not considered since they will not be physically affected by OPCA development.
2. Peak discharges are calculated for the 25-year, 24-hour design storm, which produces 5.05 inches of rainfall (consistent with past stormwater calculations presented in references 3, 4, and 5).
3. A third stormwater basin is required if the post-OPCA development peak discharge from the site exceeds the pre-OPCA development peak discharge.
4. The peak discharge under pre-OPCA development is evaluated using the site topographic survey performed by BBL on February 10, 1999 included in reference 1 above. Pre-OPCA development conditions include runoff from the parking lot located directly north of the Building 71 OPCA. This runoff drains via several catch basins and a storm sewer system which formerly daylighted just south of the fence line at the northern edge of the Building 71 OPCA. Based on a review of topographic conditions evident at the time of the February 10, 1999 survey, flow from this parking lot appeared to be directed south through the current footprint of the Building 71 OPCA and ultimately to

CLIENT: General Electric Company

PROJECT: GE Pittsfield, MA

Prepared By: BMS

Date: 3-5-02

TITLE: Engineering Design Calculations

Reviewed By: PMB

Date: 3/14/02

SUBJECT: OPCA - 2002 Drainage Evaluation

Reviewed By: WAR

Date: 3/14/02

the Merrill Road culvert prior to any OPCA development activities.

5. The peak discharge under post-OPCA development is evaluated using the anticipated final configuration of the OPCAs as presented in reference 2 above, with surrounding topography remaining essentially as shown on reference 1 (i.e., unchanged from pre-OPCA development conditions). Additionally, runoff from an area to the north and west of the Hill 78 OPCA that exists currently as a depression is assumed to drain to the Merrill Road culvert via the existing storm sewer trunk line under post-OPCA development conditions.
6. Runoff curve numbers for native soil areas (i.e., those areas outside the final combined OPCA footprint) are based on hydrologic soil group B. Runoff curve numbers for the OPCAs are based on hydrologic soil group C. Specific runoff curve numbers used in this analysis include the following:
 - Undeveloped areas covered by woods-grass combination (poor hydrologic condition) = 73
 - Unpaved roads = 82
 - Post-development OPCA areas (grassland, fair hydrologic condition) = 79
 - Building roofs (impervious) = 98

OVERVIEW:

In addition to a large upgradient residential area, the Merrill Road culvert receives stormwater runoff from a large portion of the GE property between Merrill Road, Tyler Street Extension, New York Avenue, and a General Dynamics parking lot. Portions of the GE property not affected by OPCA development (e.g., the Pittsfield Generating Company plant area) are not included in this evaluation.

Stormwater runoff calculations have been previously prepared to support the design of the 1999 stormwater basin (located south of the Building 71 OPCA) and the 2000 stormwater basin (located north of the Building 71 OPCA) and related stormwater management features (open channels, basin outlet pipes, etc.). These calculations were submitted for review and approval by the Agencies in the June 2 and 13, 2000 letters. Because the results of these past stormwater calculations remain valid and they have been conditionally approved by the Agencies, this evaluation makes use of their results wherever possible (i.e., stormwater runoff calculations are not repeated for areas previously analyzed).

In addition to the above-referenced calculations, this evaluation includes new stormwater runoff calculations to assess portions of the site not previously evaluated. These areas are significantly smaller than those previously evaluated in past calculations but have been included in this evaluation in order to completely assess the impact of OPCA development on stormwater discharge to the Merrill Road culvert.

CALCULATIONS:

Attachment 1 to this calculation package contains separate watershed area maps for the pre- and post-OPCA development conditions. The following table presents pre- and post-OPCA development peak discharges to the Merrill Road culvert from each watershed identified on the attached watershed area maps. As discussed above, some of the peak discharges presented below were obtained directly from past stormwater calculations, while others were calculated specifically for this evaluation. The notes for the following table indicate the origins of the various peak discharges. The cumulative peak discharges to the Merrill Road culvert from the site areas for the pre- and post-OPCA development conditions are totaled in the last row of the table.

CLIENT: General Electric Company PROJECT: GE Pittsfield, MA
TITLE: Engineering Design Calculations
SUBJECT: OPCA - 2002 Drainage Evaluation

Prepared By: BMS Date: 3-5-02
Reviewed By: PHB Date: 3/14/02
Reviewed By: WAR Date: 3/14/02

Watershed	25-year, 24-hour Estimated Peak Discharge [cfs]	
	Pre-OPCA Development	Post-OPCA Development
1999 Stormwater Basin ¹	23.3	19.7
2000 Stormwater Basin ²	0.0	0.8
Northwest Portion of General Dynamics Parking Lot ³	12.0	-
Isolated Depression Along Southern Edge of Tyler Street Extension ⁴	0.0	5.0
Southern Collar of Hill 78 OPCA ⁵	1.6	1.4
Totals:	36.9	26.9

Notes:

1. Pre- and post-OPCA development peak discharges are from reference 3 and include runoff from the northeast portion of the General Dynamics parking lot. Under both development conditions, runoff from this area of the parking lot drains directly to the Merrill Road culvert via open channel and pipe flow.
2. Although runoff from this area has been analyzed previously (reference 4), no pre-OPCA development peak discharge was calculated because the majority of the area that drains to the 2000 stormwater basin under post-OPCA development conditions exists as an isolated depression and contributes zero off-site runoff. Under post-OPCA development conditions, this area is occupied by the 2000 stormwater basin and the OPCAs, and the resulting runoff is routed through the 2000 stormwater basin. Runoff from the northwest portion of the General Dynamics parking lot is also included in the post-OPCA development peak discharge because the runoff is routed through the 2000 stormwater basin.
3. Pre-OPCA development peak discharge is from reference 5. Under pre-OPCA development conditions, runoff from this area drains directly to the Merrill Road culvert via open channel and pipe flow. Under post-OPCA development conditions, runoff from this area is directed into the 2000 stormwater basin. No post-OPCA development peak discharge is presented because it has been accounted for in the peak discharge from the 2000 stormwater basin watershed (see note 2 above).
4. Pre- and post-OPCA peak discharges were calculated specifically for this watershed evaluation. Under pre-OPCA development conditions, it is assumed that all runoff from the isolated depression area is retained within the area, thereby producing zero off-site runoff. Under post-OPCA development conditions, it is assumed that the remainder of this isolated depression not filled over by the OPCAs will be drained into the existing storm sewer trunk line and conveyed to the Merrill Road culvert. Supporting calculations for these values are provided as Attachment 2 to this calculation sheet.
5. Pre- and post-OPCA peak discharges were calculated specifically for this evaluation. Under pre-OPCA development conditions, runoff from this area flows to the Merrill Road culvert via overland flow. Under post-OPCA development conditions, this area contains a collar area of the Hill 78 OPCA that is not able to be routed through either the 1999 or 2000 stormwater basin. Supporting calculations for these values are provided as Attachment 3 to this calculation sheet.

SUMMARY:

As indicated in the table above, construction of the OPCAs is expected to decrease the peak discharge to the Merrill Road culvert during the 25-year, 24-hour storm by approximately 10 cfs. Consequently, a third stormwater basin intended to attenuate post-OPCA development peak discharges to the Merrill Road culvert is not required. It should be noted that, for ease of presentation, this evaluation assumes that the peak discharge from each of the above watersheds reaches the Merrill road culvert at precisely the same time. While this condition is not likely to occur, the assumption provides further conservatism in the evaluation.

Attachment 1

Watershed Area Maps for Pre- and Post-OPCA Development Conditions

NORTHWEST PORTION
OF GENERAL DYNAMICS
PARKING LOT

ISOLATED
DEPRESSION

1999 STORMWATER
BASIN

LEGEND

- GAS MARKER
- GUY ANCHOR
- MONITORING WELL
- SANITARY MANHOLE
- CATCH BASIN
- DRAIN MANHOLE
- WATER METER PIT
- ELECTRIC MANHOLE
- UTILITY POLE
- WATER VALVE
- FIRE HYDRANT
- CENTERLINE DITCH
- ABOVE GROUND STEAM PIPE
- DRAINAGE LINES
- SANITARY LINES
- OVERHEAD UTILITY
- CHAIN LINK FENCE
- EDGE OF BRUSH AND WOODS
- APPROXIMATE LEASE AND EASEMENT
LINE LOCATION (SEE NOTE 14)
- INFERRED PROPERTY LINE LOCATION
- INDEX CONTOUR LINE
- INTERMEDIATE CONTOUR LINE

NOTES:

- BASE MAP INFORMATION SHOWN ON THIS DRAWING WAS DEVELOPED FROM FIELD SURVEY DATA OBTAINED BY BLASLAND, BOUCK & LEE, INC. ON FEBRUARY 10, 1999. CONDITIONS SHOWN ARE APPROXIMATE ONLY DUE TO SNOW AND ICE ACCUMULATIONS EXISTING AT TIME OF SURVEY.
- ELEVATIONS SHOWN ARE REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM (NGVD) 1929.
- HORIZONTAL DATUM IS REFERENCED TO THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM (NAD 1927).
- CONTOUR INTERVAL EQUALS 1 FOOT.
- DIFFERENCES NOTED BY THE CONTRACTOR BETWEEN BASE MAP INFORMATION AND ACTUAL SITE CONDITIONS, WHICH MAY AFFECT THE DESIGN CONFIGURATION, SHALL BE SUBMITTED TO GE. MODIFICATIONS MAY BE MADE TO THE DESIGN CONFIGURATION DURING PERFORMANCE OF THE SITE WORK AT THE DISCRETION OF GE.
- CONTRACTOR SHALL VERIFY THE PRESENCE AND LOCATION OF ALL ABOVE GROUND AND UNDER GROUND SITE FEATURES IN THE VICINITY OF PROPOSED CONSTRUCTION ACTIVITIES PRIOR TO COMMENCEMENT OF SITE WORK. ADDITIONAL SITE FEATURES MAY BE PRESENT WHICH ARE NOT SHOWN ON THIS DRAWING. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH GE TO DETERMINE THE PRESENCE AND LOCATION OF SUCH FEATURES SHOULD THEY EXIST AND THE LOCATION OF ON-SITE EASEMENTS LEASE LINES AND RIGHT-OF-WAYS.
- INFORMATION REGARDING SITE SURVEY CONTROL WILL BE PROVIDED BY GE FOR CONTRACTOR USE PRIOR TO COMMENCEMENT OF SITE WORK. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY FOR ESTABLISHING AND MAINTAINING CONSTRUCTION SURVEY CONTROL DURING PERFORMANCE OF THE CONTRACT WORK.
- CONTRACTOR SHALL ASSUME EXISTING FENCING AT PERIMETER OF SITE IS GE'S PROPERTY LINE. NO WORK SHALL BE PERFORMED OUTSIDE THE PROPERTY LINE WITHOUT GE'S PRIOR APPROVAL. GE WILL OBTAIN APPROVALS FOR ANY WORK WITHIN IDENTIFIED LEASE OR EASEMENT AREAS.
- CONTRACTOR SHALL PROVIDE ALL LOCAL (NON-ENVIRONMENTAL) PERMITS AND MAKE ARRANGEMENTS FOR LOCAL INSPECTIONS (AS NECESSARY).
- CONTRACTOR SHALL FURNISH AND PLACE PROPER GUARDS FOR PREVENTION OF ACCIDENTS, PROVIDE ALL TRENCH SHORING, SCAFFOLDING, SHIELDING, DUST/FUME PROTECTION, SAFETY RAILINGS, BARRIERS, OR OTHER SAFETY FEATURES REQUIRED. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SUFFICIENT LIGHTS DURING NIGHT HOURS TO SECURE SUCH PROTECTION.
- CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THIS CONTRACT. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS FOR THE SAFETY OF, AND SHALL PROVIDE THE NECESSARY PRECAUTION TO PREVENT DAMAGE, INJURY, OR LOSS TO ALL EMPLOYEES ON THE WORK AND ANY OTHER PERSONS WHO MAY BE AFFECTED THEREBY.
- EXISTING SURFACES OR FEATURES NOT SPECIFIED FOR MODIFICATION THAT ARE DAMAGED OR DESTROYED AS A RESULT OF WORK PERFORMED UNDER THIS CONTRACT SHALL BE RESTORED BY THE CONTRACTOR TO THEIR PRECONSTRUCTION CONDITION IN A TIMELY MANNER.
- ALL CONTRACTOR RELATED ACTIVITIES SHALL BE PERFORMED IN A MANNER WHICH ALLOWS FOR ALL NECESSARY OPERATING ACTIVITIES ASSOCIATED WITH THE U.S. GENERATING COMPANY AND GENERAL DYNAMIC COMPANY FACILITIES. ANY WORK DEEMED NECESSARY WHICH MAY AFFECT THOSE FACILITIES SHALL BE BROUGHT TO THE ATTENTION OF GE PRIOR TO COMMENCEMENT OF SUCH WORK. GE SHALL PROVIDE THE CONTRACTOR WITH AUTHORIZATION TO PROCEED PROVIDED GE AND THE AFFECTED PARTY(IES) DEEM THE ACTION NECESSARY AND ACCEPTABLE.
- LEASE AND EASEMENT LINE LOCATIONS SHOWN ON THIS DRAWING DIGITIZED FROM PLAN PREPARED BY DESIGN GROUP, INC. ENTITLED "PLAN OF LAND SURVEYED FOR GENERAL ELECTRIC COMPANY", DATED FEBRUARY 18, 1993 (PROJECT NO. 930004) AND ARE APPROXIMATE ONLY.

PRE-OPCA DEVELOPMENT
WATER SHEDS

NOT FOR CONSTRUCTION

GENERAL ELECTRIC COMPANY • PITTSFIELD, MASSACHUSETTS
DETAILED WORK PLAN FOR ON-PLANT CONSOLIDATION AREAS

EXISTING SITE PLAN

GENERAL

File Number
201.85.XXF
Date
JUNE 1999
Blasland, Bouck & Lee, Inc.
Corporate Headquarters
6723 Towpath Road
Syracuse, NY 13214
315-446-9120

A-1

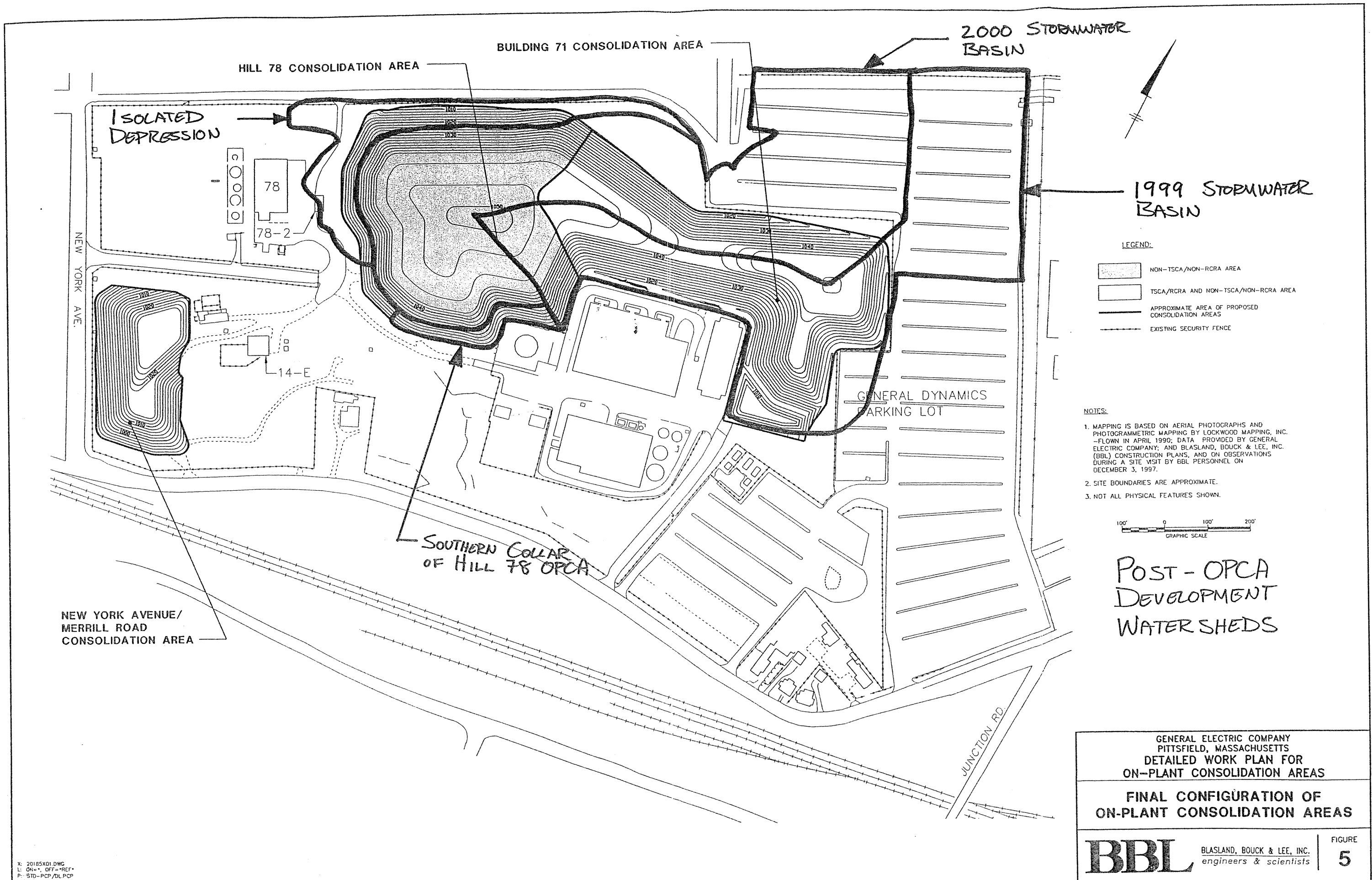
X: 20185X01.DWG
L: 01/10/99 OFF=REF*
P: STD-PCP/DL
6/10/99 SYR 54-NES NES GMS
20185003/WORKPLAN/20185001.DWG

Graphic Scale
100' 0 100' 200'
THIS DRAWING IS THE PROPERTY OF GENERAL ELECTRIC COMPANY AND MAY NOT BE REPRODUCED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF GENERAL ELECTRIC COMPANY.

No.	Date	Revisions

Project Mgr. _____
Designed by _____
Drawn by _____
Checked by _____
Prof. Eng. _____
PE License _____

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists



Attachment 2

Stormwater Runoff Calculations for Isolated Depression Watershed

No stormwater runoff calculations were prepared for the isolated depression watershed under pre-OPCA development conditions because the area is assumed to produce zero off-site runoff.

Type.... SCS Unit Hyd. Summary
Name.... DEPRESSION -POST Tag: 25yr24
File.... V:\GE_PITTSFIELD_CD_OPCAS_CONFIDENTIAL\NOTES AND DATA\DESIGN\DRADPRESSION
WATERSHED - POST-OPCA.PPW
Storm... TypeIII 24hr Tag: 25yr24

Page 2

Event: 25 yr

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 yr year storm
Duration = 24.0000 hrs Rain Depth = 5.0500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = V:\GE_PITTSFIELD_CD_OPCAS_CONFIDENTIAL\NOTES AND

DATA\DESIGN\DRA

HYG File - ID = - DEPRESSION -POST 25yr24
Tc = .1000 hrs
Drainage Area = 1.880 acres Runoff CN= 76

=====
Computational Time Increment = .01333 hrs
Computed Peak Time = 12.1067 hrs
Computed Peak Flow = 4.97 cfs

POST-OPCA
PEAK DISCHARGE

Time Increment for HYG File = .0100 hrs
Peak Time, Interpolated Output = 12.1102 hrs
Peak Flow, Interpolated Output = 4.97 cfs
=====

DRAINAGE AREA

ID:DEPRESSION -POST
CN = 76
Area = 1.880 acres
S = 3.1579 in
0.2S = .6316 in

Cumulative Runoff

2.5768 in
.404 ac-ft

HYG Volume... .404 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

* Time Concentration, Tc = .10000 hrs (ID: None Selected)
Computational Incr, Tm = .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 21.30 cfs
Unit peak time Tp = .06667 hrs
Unit receding limb, Tr = .26667 hrs
Total unit time, Tb = .33333 hrs

* Tc ASSUMED TO BE MINIMUM BECAUSE FINAL GRADING
IN THIS WATERSHED HAS YET TO BE DETERMINED. THIS IS
A CONSERVATIVE ASSUMPTION BECAUSE IT RESULTS IN
THE LARGEST PEAK DISCHARGE.

Type.... Runoff CN-Area
Name.... DEPRESSION -POST

Page 1

File.... V:\GE_PITTSFIELD_CD_OPCAS_CONFIDENTIAL\NOTES AND DATA\DESIGN\DRADPRESSION
WATERSHED - POST-OPCA.PPW
Title... Depression Watershed - Post-OPCA Development Condition

RUNOFF CURVE NUMBER DATA

.....

Depression Watershed - Post-OPCA Development Condition

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C %UC	Adjusted CN
OPCA Final Cover Area	79	.750		79.00
Undeveloped Area	73	1.040		73.00
Unpaved Road	82	.080		82.00
Bldg. Roof	98	.010		98.00

COMPOSITE AREA & WEIGHTED CN ---> 1.880 75.91 (76)
.....

Attachment 3

Stormwater Runoff Calculations for Southern Collar Watershed

Type.... Runoff CN-Area
Name.... OPCA SW - PRE

Page 1

File.... V:\GE_PITTSFIELD_CD_OPCAS_CONFIDENTIAL\NOTES AND DATA\DESIGN\DRAOPCA SOUTHERN
EDGE WATERSHED.PPW

RUNOFF CURVE NUMBER DATA

.....

Soil/Surface Description	CN	Area acres	Impervious Adjustment		Adjusted CN
			%C	%UC	
Undeveloped areas	73	.690			73.00

COMPOSITE AREA & WEIGHTED CN ---> .690 73.00 (73)
.....

Type.... SCS Unit Hyd. Summary
Name.... OPCA SOUTH - PRE Tag: 25yr24
File.... V:\GE_PITTSFIELD_CD_OPCAS_CONFIDENTIAL\NOTES AND DATA\DESIGN\DRAOPCA SOUTHERN
EDGE WATERSHED.PPW
Storm... TypeIII 24hr Tag: 25yr24

Page 2

Event: 25 yr

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 yr year storm
Duration = 24.0000 hrs Rain Depth = 5.0500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = V:\GE_PITTSFIELD_CD_OPCAS_CONFIDENTIAL\NOTES AND

DATA\DESIGN\DRA

HYG File - ID = - OPCA SOUTH - PRE 25yr24
Tc = .1000 hrs
Drainage Area = .690 acres Runoff CN= 73

=====
Computational Time Increment = .01333 hrs
Computed Peak Time = 12.1200 hrs
Computed Peak Flow = 1.64 cfs

PRE-OPCA
PEAK DISCHARGE

Time Increment for HYG File = .0100 hrs
Peak Time, Interpolated Output = 12.1202 hrs
Peak Flow, Interpolated Output = 1.64 cfs
=====

DRAINAGE AREA

ID:OPCA SW - PRE
CN = 73
Area = .690 acres
S = 3.6986 in
0.25 = .7397 in

Cumulative Runoff

2.3197 in
.133 ac-ft

HYG Volume... .133 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .10000 hrs (ID: OPCA SW - PRE)
Computational Incr, Tm = .01333 hrs = 0.20000 Tp
Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 7.82 cfs
Unit peak time Tp = .06667 hrs
Unit receding limb, Tr = .26667 hrs
Total unit time, Tb = .33333 hrs

* Tc VALUE ASSUMED TO BE MINIMUM DUE TO
PROXIMITY TO MORRILL ROAD CULVERT +
STEEP TERRAIN

Type.... Runoff CN-Area
Name.... OPCA SW - POST

Page 1

File.... V:\GE_PITTSFIELD_CD_OPCAS_CONFIDENTIAL\NOTES AND DATA\DESIGN\DRAOPCA SOUTHERN
EDGE WATERSHED.PPW

RUNOFF CURVE NUMBER DATA

.....

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C %UC	Adjusted CN
OPCA Final Cover Area	79	.490		79.00

COMPOSITE AREA & WEIGHTED CN ---> .490 79.00 (79)
.....

Type.... SCS Unit Hyd. Summary
Name.... OPCA SOUTH- POST Tag: 25yr24
File.... V:\GE_PITTSFIELD_CD_OPCAS_CONFIDENTIAL\NOTES AND DATA\DESIGN\DRAOPCA SOUTHERN
EDGE WATERSHED.PPW
Storm... TypeIII 24hr Tag: 25yr24

Page 2

Event: 25 yr

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 yr year storm

Duration = 24.0000 hrs Rain Depth = 5.0500 in

Rain Dir = C:\HAESTAD\PPKW\RAINFALL\

Rain File -ID = SCSTYPES.RNF - TypeIII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = V:\GE_PITTSFIELD_CD_OPCAS_CONFIDENTIAL\NOTES AND

DATA\DESIGN\DRA

HYG File - ID = - OPCA SOUTH- POST 25yr24

Tc = .1000 hrs *

Drainage Area = .490 acres Runoff CN= 79

Computational Time Increment = .01333 hrs

Computed Peak Time = 12.1067 hrs

Computed Peak Flow = 1.43 cfs

POST-OPCA
PEAK DISCHARGE

Time Increment for HYG File = .0100 hrs

Peak Time, Interpolated Output = 12.1102 hrs

Peak Flow, Interpolated Output = 1.42 cfs

DRAINAGE AREA

ID:OPCA SW - POST

CN = 79

Area = .490 acres

S = 2.6582 in

0.25 = .5316 in

Cumulative Runoff

2.8447 in

.116 ac-ft

HYG Volume... .116 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .10000 hrs (ID: OPCA SW - Post)

Computational Incr, Tm = .01333 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 5.55 cfs

Unit peak time Tp = .06667 hrs

Unit receding limb, Tr = .26667 hrs

Total unit time, Tb = .33333 hrs

* Tc VALUE ASSUMED TO BE MINIMUM DUE
TO PROXIMITY TO MORRILL ROAD CULVERT
& STOOD TERRAIN.